

VOLUME 3: #5

SOFTWARE PERFORMANCE SUMMARY
FOR THE
PDP-8 & PDP-12

SOFTWARE INFORMATION SERVICE

SOFTWARE PERFORMANCE SUMMARY

This Software Performance Summary is intended to supplement your set of Family of 8 software. It contains all current information on known software problems, patches, manual corrections and programming notes. Each article is coded sequentially by system program in the lower right hand corner. As new versions correct software problems and reprinted manuals include programming notes and manual corrections, new articles will announce the revised software and specify by this code which articles should be removed from your Software Performance Summary file. Articles may also be replaced when new information becomes available; such as, a procedure to circumvent a problem may replace the original report of the problem. This information, as well as newly discovered problems, methods, etc., is printed in Digital Software News for the PDP-8 & PDP-12. To assure that the monthly Digital Software News is sent to the appropriate software contact at your installation, please check with the Software Specialist or Sales Engineer at your local Digital Office.

Additional copies of the current Software Performance Summary and updated copies of the PDP-8/12 Software Price List are available at no charge upon request from the Program Library. As with usual orders for software, the Program Library will accept orders received directly from U.S. customers. All other customer orders must be routed through the nearest Digital Representative.

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RTPS FORTRAN IV (DEC-08-LRTDA) (F4.SV version 1.06)
Problem with arithmetic functions

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RTPS FORTRAN IV (F4.SV version 1.06)
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RTPS FORTRAN IV (DEC-08-LRTDA)
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AIPOS MONITOR

Problem on RUBOUT

In the AIPOS Monitor, on RUBOUT, the command interpreter sometimes stores information in the wrong file descriptor block. To correct this problem, the following binary patch should be implemented.

Block 1 (add 1 to the starting block) of JOB CONTROL

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 224 | 7001 | 7000 |

To implement a source patch, CM02, line 417 [IAC] should be deleted. The segment of the source should now read:

```
TAD I P1FAUX
AND P7
IAC
DCA FILCNT
JMP CMI180
```

Procedures to restore destroyed instructions.

The current version of the Binary Loader (DEC-08-LBAA) dated May 10, 1967 is not compatible with either the Bootstrap Loader for the TC01 DECTape Library System (DEC-08-LUAA) or with any program using the DISK Data Break (Locations 7750 & 7751).

The Binary Loader uses locations 7614-7616 as temporary storage of variables thus destroying the three instructions of the TC01 Bootstrap which should be in these locations. To restore the Bootstrap after reading in or using the Binary Loader the user should restore the contents of locations 7614-7616 as follows:

| | | | |
|------|------|------|--------|
| 7614 | 6766 | DCTA | DTXA |
| 7615 | 3354 | DCA | WCOUNT |
| 7616 | 6771 | DTSF | |

The TC01 bootstrap may then be started as usual at location 7600. This version of the Binary Loader does not harm the Bootstrap Loader for the 552/555 DECTape Library System (Digital-8-3-U).

The Binary Loader also uses locations 7750 and 7751 for instructions. These two locations are used by the DF32 Mini Disk as its Word Count and Current Address registers for 3 cycle Data Break I/O transfers. Any disk I/O the user may do will, therefore, destroy the two instructions of the Binary Loader contained in locations 7750 and 7751. To restore the Binary Loader, restore the contents of these locations as follows:

| | | | |
|------|------|-----|------------|
| 7750 | 1355 | TAD | WORD2 |
| 7751 | 5743 | JMP | I ASSEMB . |

The Binary Loader may then be started at 7777 and used as usual.

PDP-8 BINARY PUNCH PROGRAM (DEC-08-YXYA)

Failure to punch location 7777

The current version of the Binary Punch Program (DEC-08-YX1A-PB, Low Speed Punch; DEC-08-YX2A-PB, High Speed Punch) fails to punch out location 7777 when it is specified as the last location in a block. The following patch will correct this problem:

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 7510 | 7041 | 7141 |
| 7515 | 7100 | 2370 |
| 7516 | 2370 | 7100 |

DISK DDT (DEC-D8-CDE1-PB and DEC-D8-CDE2-PB)

Patch to use high speed reader for reading symbol table tapes.

The patch given below will be of use to users who have no low speed paper tape reader and who wish to use Disk DDT but who are hampered by the fact that only the low speed reader may be used to read in user symbol table tapes. The patch is used as follows:

- 1) Load the program to be debugged into core.
- 2) Call DDT into core by typing DDT_↓ in response to a Monitor "."
- 3) Stop DDT by depressing STOP on the console; then load the patch into core using the Binary Loader (system LOADER will destroy DDT). Note that the patch overlays one location in DDT (loc 3374) and thus the patch must be read in after DDT is in core.
- 4) Place the symbol table tape in the high speed reader with leader code under the read head.
- 5) Start the patch at location 4600¹. The high speed reader will be initialized and control will pass to DDT, which will be expecting a command.
- 6) Type ALT MODE (or ESCape) R (echoes as [R) - the symbol table tape will read in.
- 7) After the last symbol has been read, DDT will type the new lower limit of the external symbol table, followed by an up-arrow (↑) to show that it is waiting for CONTROL P (↑P).
- 8) Type CONTROL P (↑P) - DDT will now be ready to accept commands, and the user may begin debugging, using the symbols he has just read in.

¹ Users may change the location of the patch by changing the *4600 in the source and reassembling, being careful not to overlay any locations in his own program or any locations in DDT other than loc 3374, which must contain the constant READHS.

```

/ROUTINE TO ALLOW DISK DDT TO READ
/SYMBOL TABLE TAPE FROM HIGH SPEED
/READER
/

```

```

COMM=2513
START2=2403
COMM34=3374
PUNOUT=3455
READKB=3401
*COMM34

```

```

3374 4603 READHS /CHANGE DDT SYM TAB READ ROUTINE ADDR
*4600
4600 6014 RFC /INITIALIZE HS READER
4601 5602 JMP 1 .+1 /JUMP TO
4602 2403 START2 /START2 IN DDT
4603 0000 READHS,0
4604 7200 CLA
4605 1244 TAD COMM1A /GET ADDR OF NEW TABLE READ ROUTINE
4606 3645 DCA I INCOMM /STORE IT IN DDT
4607 6011 RSF /WAIT ON FLAG
4610 5207 JMP .-1
4611 7200 CLA
4612 6016 RRB RFC /GET CHARACTER
4613 3251 DCA TFM1 /STORE IT
4614 1251 TAD TFM1
4615 1250 TAD MIN200 /IS IT LEADER-TRAILER (200)
4616 7450 SNA
4617 5204 JMP READHS+1 /YES - IGNORE IT
4620 1252 TAD CON1 /IS IT LINE FEED (212)
4621 7650 SNA CLA
4622 5234 JMP EXITA /YES - GET CHAR AND EXIT
4623 1251 TAD TFM1
4624 1253 TAD CON1+1 /IS IT ROBOUT (377)
4625 7450 SNA
4626 5204 JMP READHS+1 /YES - IGNORE IT
4627 1254 TAD CON1+2 /IS IT EOT (204)
4630 7650 SNA CLA
4631 5236 JMP FIXUP /YES - RESTORE CHANGED DDT LOCS
4632 1251 RETN, TAD TEM1 /NO - GET CHAR
4633 4647 JMS I OUTPUN /ECHO IT
4634 1251 EXITA, TAD TFM1 /EXIT WITH CHAR IN AC
4635 5603 JMP I READHS
4636 1243 FIXUP, TAD COMM1
4637 3645 DCA I INCOMM
4640 1243 TAD COMM1
4641 3646 DCA I INCOMM+1
4642 5232 JMP RETN

```

```

/
/
4643 3401 COMM1, READKB
4644 4603 COMM1A, READHS
4645 2513 INCOMM, COMM
4646 3374 COMM34
4647 3455 OUTPUN, PUNOUT
4650 7600 MIN200, 7600
4651 0000 TFM1, 0
4652 7766 CON1, -12
4653 7401 -377
4654 0173 173

```

NOTE: Once a symbol table has been read in via the high-speed reader, DDT is restored to its normal state. If the user types [R again, DDT will expect symbols from the teletype/low speed reader. If the user wishes to read in more than one symbol table tape with the high speed reader, he may NOP locations 4640 and 4641 of the patch, which restore the overlaid DDT location, and DDT will always expect additions to the symbol table to be input via the high speed reader. This patch cannot take full advantage of the high speed reader, for DDT still handles the input characters one at a time rather than buffering them as they are read.

An assembly listing of the patch follows:

PDP-8 DISK DDT (DEC-D8-CDE1 & DEC-D8-CDE2)

Failure to recognize overflow of the user symbol table

The Library version of Disk DDT does not correctly test for overflow of the user symbol table. The following patch will cause DDT-D, on occasion of symbol table overflow, to print a carriage return and line feed, and the new lower limit of the user symbol table, followed by a "↑" to indicate that it is waiting for a Control P (↑P).

Patch .DDT (DEC-D8-CDE2-PB) before saving it on the system device as follows:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 3306 | 1361 | 5777 |
| 3353 | 0401 | 7160 |
| 3377 | unused | 4554 |
| 4554 | " | 4757 |
| 4555 | " | 1760 |
| 4556 | " | 5761 |
| 4557 | " | 3463 |
| 4560 | " | 3361 |
| 4561 | " | 3307 |

PDP-8 DECTAPE COPY ROUTINE (DEC-08-YPTA-PB)

Problem in DECTape Copy Routine

DECTape Copy does not work if the field bits in the DECTape Status Register B are not 0 on entry to the program. The START key clears these bits, however, if the program is loaded by PS/8 from the disk file, these bits may be set.

The following patch will correct this problem:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 0242 | 7450 | 7440 |
| 0243 | 5247 | 1044 |
| 0244 | 1044 | 7660 |
| 0245 | 7620 | 5200 |
| 0246 | 5200 | 6774 |

PDP-8 DEctape FORMATTER (DEC-08-EUFB-PB)

Patch to ignore DEctape flag when starting Pass 2.

The following patch corrects a problem in the current version of the DEctape FORMATTER. The patch is to ignore a spurious DEctape flag when the DEctape is doing a MOVE REVERSE, immediately after the mark and timing tracks have been written. Without the patch, the DEctape will halt, and it will be necessary to restart the program and rewrite the mark and timing tracks. Since this error only happens occasionally, the restart is usually not much of an inconvenience; but if the error should occur during batch formatting, say on the eighth tape, it would require doing pass 1 for all eight tapes again. Thus, users doing large-scale formatting should definitely implement the patch, for restart would be costly.

The patch is as follows:

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 1631 | (2021) | 4370 |
| 1770 | (unused) | 0000 |
| 1771 | (unused) | 6771 |
| 1772 | (unused) | 7410 |
| 1773 | (unused) | 5222 |
| 1774 | (unused) | 2021 |
| 1775 | (unused) | 5770 |
| 1776 | (unused) | 2370 |
| 1777 | (unused) | 5770 |

PDP-8 DECTAPE FORMATTER (DEC-08-EUFB-PB)

Patch to Halt on receipt of unexpected interrupt

The current version of the PDP-8 DECTape Formatter does not correctly handle interrupts from unexpected devices (e.g., the LP08 Line Printer). The following patch will cause the Formatter, on receipt of an unexpected interrupt, to halt with

PC=0550
MA=0547
MB=7402

The user may then restart the program at Loc. 1000 (the START key should clear the flag of the unexpected device).

The patch is as follows:

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 0545 | (6042) | 5525 |
| 0547 | (5364) | 7402 |
| 0633 | (0000) | 6042 |
| 0634 | (7300) | 6031 |
| 0635 | (1534) | 5637 |
| 0636 | (7640) | 5640 |
| 0637 | (5235) | 0564 |
| 0640 | (6764) | 0550 |

PDP-8 DISK EDITOR (DEC-D8-ESAD-PB)

Two Problems in the DISK EDITOR have been found and corrected.

The first problem concerns rubbing out past the beginning of a line while in Search mode. Because it is caused by the contents of a previous text buffer, the problem occurs rarely. The correction to this problem is as follows:

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 1332 | 1014 | 5733 |
| 1333 | 3114 | 3342 |
| 3342 | (unused) | 1014 |
| 3343 | (unused) | 3114 |
| 3344 | (unused) | 3526 |
| 3345 | (unused) | 5746 |
| 3346 | (unused) | 1334 |
| 0053 | 3342 | 3347 |
| 0126 | 3342 | 3347 |

The second problem occurs when in Append mode. If an odd number of characters are put in a line terminated with a CR, and the user immediately starts rubbing out, the EDITOR will rub out even though no characters are on the current line. Again, this causes damage to the text buffer. If this occurs, please make the following correction:

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 1323 | 1173 | 1116 |
| 1362 | 5345 | 5344 |

PDP-8 DISK LINKING LOADER (DEC-08-A2C7)

Patch to allow the Linking Loader to recognize CONTROL C (↑C) when it is waiting for a FIELD specification.

The library version of the PDP-8 Disk Linking Loader fails to recognize a CONTROL C (↑C) when it is waiting for a FIELD specification following user selection of the L or O loading options; it treats ↑C as an illegal FIELD designation and responds with:

?
*OPT-

The following patch will correct this error and recognize ↑C as a call to the Monitor.

| <u>LOC</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|------------|---------------------|---------------------|
| 6065 | (7200) | 5374 |
| 6066 | (5654) | 0055 |
| 6174 | (unused) | 1266 |
| 6175 | (") | 7650 |
| 6176 | (") | 5451 |
| 6177 | (") | 5654 |

The patch may be toggled in after loading the Linking Loader into core. Once the patch is made the Loader may be resaved on the disk.

PDP-8 Disk/DEctape Monitor System (DEC-D8-SBAF-PB)

Patching programs before storing on the system device

The following steps apply to patching any disk/DEctape system program.

1. Set up the program (to be patched) for loading with the Disk System Loader. Answer all of its questions as usual with the exception of the starting address.
2. When the Loader requests the starting address (ST=), type 7636 for disk or 7606 if the system device is DEctape. This will provide the halt referenced in step 4.
3. Load the program to be patched.
4. When loading is complete, the system will halt.
5. Now the desired patches may be made to the program in core.
6. Load address 7600, press START and control will return to the monitor.
7. Type the SAVE command as usual.

PDP-8 DISK LINKING LOADER (DEC-08-A2C7-PB)

Problem with deletion of temporary RIM format file

The current version of the Disk Linking Loader does not properly delete the temporary RIM format file it sometimes creates. This RIM format file is named .R.R.USER and is created when the user attempts to load data over the loader itself. This file is supposed to be deleted from the DN and SAM blocks upon user execution of an 'E' (EXIT with halt) or 'S' (START main program) option.

Due to improper handling of the DN and SAM block numbers, however, the temporary file is not correctly deleted from the Directory Name block, but remains there with a zero block-length specification. A further consequence of this problem may be the destruction of five words in one of the SAM blocks when the loader mistakenly zeros five words there, instead of the five word DN block entry for the RIM file.

The following patch will correct this problem and should be made to the Linking Loader before saving it on the system device:

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 4250 | (4721) | 5324 |
| 4324 | (unused) | 1077 |
| 4325 | (") | 3332 |
| 4326 | (") | 4721 |
| 4327 | (") | 1332 |
| 4330 | (") | 3077 |
| 4331 | (") | 5251 |
| 4332 | (") | 0000 |

Programming note on chaining in the PDP-8 Disk Monitor System

The following procedure illustrates the chaining of programs under the Disk Monitor System for the 8 Disk/DECTape system. First, save each overlay as a system program in the normal manner. Second, a call from one program to bring in the next program as an overlay must be done as follows:

1. In locations 7400 and 7401 deposit the ASCII codes for the name of the system program to be loaded.
(Note: These ASCII codes are the eight bit code minus 240)
2. In order to enter the routines which bring in the overlay, execute the following code:

```

                                JMS I DYSKIO      /LINK TO MONITOR I/O
                                3                /READ
                                10             /BLOCK #10 (DECTAPE #13)
                                7200          /CORE ADDRESS
                                0
                                HLT             /ERROR RETURN
                                JMP I .+1      /LINK TO LOADER
                                7201
DYSKIO,                          7642
```

The following example of a program that only brings in an overlay, called "TEST", may be helpful to many users.

```

                                *200
0200      7000      NOP
0201      7000      NOP
0202      4612      JMS I DYSKIO
0203      0003      3
0204      0010      10
0205      7200      7200
0206      0000      0
0207      7402      HLT
0210      5611      JMP I .+1
0211      7201      7201
0212      7642DYSKIO,7642

                                *7400
7400      6445      6445      /TE WITH 240 SUB. FROM EACH CHAR
7401      6364      6364      /ST
```


PDP-8 EAE FLOATING POINT PACKAGE (DIGITAL 8-25-F)

Patches to correct ALIGN Routine and check for largest negative mantissa

The current version of the PDP-8 EAE (Extended Arithmetic Element) Floating Point Package has an incorrect constant in the ALIGN routine for addition and subtraction. The constant only makes a difference when the two numbers being added vary greatly in magnitude. The following patch corrects the problem:

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 6167 | 7747 | 7750 |

The EAE Floating Point Package also fails to check for the largest negative mantissa (Octal 4000 0000) after normalization. This number could cause erroneous results in subsequent calculations. The patch to correct this problem requires several changes to the EAE package itself, plus a fifteen word patch which can be inserted anywhere in the same memory field as the EAE Floating Point Package. In the listing that follows, the patch has been placed just before the start of the Interpreter (i.e. just before loc. 5600). This patch would have to be moved for use with other versions of the EAE Packages (i.e. for packages 2, 3 or 4). The necessary changes to the EAE package are:

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---|
| 6607 | 3260 | 3367 |
| 6655 | 2260 | 2367 |
| 6657 | 5600 | 5766 |
| 6660 | 0000 | 5600 |
| 6766 | unused | 5561 (address of first word of patch) |

The following is the fifteen location patch which may be placed anywhere in the appropriate memory field. Note, location 6766 must contain the address of the first word of this patch.

| <u>LOCATION</u> | <u>CONTENTS</u> |
|-----------------|-----------------|
| 5561 | 1046 |
| 5562 | 7640 |
| 5563 | 5777 |
| 5564 | 1045 |
| 5565 | 7510 |
| 5566 | 7041 |
| 5567 | 7700 |
| 5570 | 5777 |
| 5571 | 2044 |
| 5572 | 7000 |
| 5573 | 1045 |
| 5574 | 7130 |
| 5575 | 3045 |
| 5576 | 5777 |
| 5577 | 6660 |

PDP-12

Problem with EAE

A software (hardware) problem has been reported with EAE (KE12). The instructions CLA (7601) and NMI (7411) are defined as being micro programmable, but due to a hardware problem they do not function properly when mico programmed. Hence, the instructions CLA and NMI should be used as two separate instructions.

No correction is planned for the hardware.

PDP-8 SYMBOLIC EDITOR (DEC-08-ESAC)

Problem with missing line feed

When using the Next (N) command for output to the high speed punch, a timing problem causes the final line feed (ASCII code 212) to be lost, ending the tape with a carriage return (ASCII code 215). This difficulty occurs in the current version of the Editor (DEC-08-ESAC). The problem may be corrected with the following patch:

Change: COM1,JMP FORM to COM1,JMP FORM+1

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 1300 | 5216 | 5217 |

PDP-8 SYMBOLIC EDITOR (DEC-08-ESAC)

Problem with rubbing out past beginning of lines

There is a problem with the current library version of the Symbolic Editor such that under certain conditions, the user can delete characters from right to left past the beginning of a line. This usually results in the Editor losing track of the proper line sequences. Making the following patch before starting the Editor will eliminate the problem:

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 0057 | 1624 | 1631 |
| 0115 | 1624 | 1631 |
| 1324 | 1013 | 5725 |
| 1325 | 3124 | 1624 |
| 1624 | unused | 3515 |
| 1625 | " | 1013 |
| 1626 | " | 3124 |
| 1627 | " | 5630 |
| 1630 | " | 1326 |

EDUSYSTEM 20 AND 50

Problem with 8/e KL8-e (Teletype Interface)

When running on the PDP-8e, both Edusystem 20 and 50 (TS8-E) sometimes have keyboards "go dead" for apparently no known reason.

The problem is apparently caused by the "build-up" of static electricity in terminal users' metal chairs, and the subsequent discharge on contact with the teletype. The problem only exists with respect to terminals connected directly to the Processor, and one recommendation for overcoming the problem is to use wooden chairs.

The problem may be compensated for by means of software. A patch for TS8-E Version 8.22B follows. A correction for Edu. 20 is currently not available, however a new version will be available in the near future which will include a software fix.

TS8/E VERSION 8.22B

/PATCH TO TS8/E VERSION 8.22B
/RE-ENABLES KEYBOARD INTERRUPTS
/TO CORRECT FOR KL8-E HARDWARE BUG

| | | | |
|------|------|--------------------------|---|
| | Ø114 | KDEV=Ø114 | /POINTS TO BEGINNING ON KEYBOARD DEVICE CODES |
| | Ø113 | TDEV=Ø113 | /POINTS TO END OF KEYBOARD DEVICE CODES |
| | 2412 | *2412 | |
| 2412 | 4773 | L2TIME, JMS I PATCHL | /TO PATCH - WAS "ION" |
| | 2573 | *2573 | |
| 2573 | 7152 | PATCHL, PATCH NULJOB, | /NORMAL NULL JOB |
| | 715Ø | *715Ø | |
| 715Ø | ØØØØ | PATCH, Ø | |
| 7151 | 2374 | ISZ PATCNT | /ONLY EVERY SO MANY SYSTEM TICKS |
| 7152 | 5372 | JMP PATCH2 | /OTHERWISE, JUST RETURN TO NORMAL |
| 7153 | 1375 | TAD PATINI | /RESET COUNTER |
| 7154 | 3374 | DCA PATCNT | |
| 7155 | 1114 | TAD KDEV | /SET POINTER TO KEYBOARD DEVICE CODES |
| 7156 | 3376 | DCA PATPTR | |
| .57 | 2376 | PATCH1, ISZ PATPTR | /ON TO NEXT KEYBOARD |

TS8/E VERSION 8.22B (Continued)

| | | | |
|------|------|--------------|--------------------------------|
| 7160 | 1776 | TAD I PATPTR | /GET DEVICE CODE |
| 7161 | 1377 | TAD C6005 | /MAKE IT INTO "KIE" |
| 7162 | 3364 | DCA .+2 | /SET TO EXECUTE IT |
| 7163 | 7001 | IAC | /"1" IN AC TO ENABLE |
| 7164 | 0000 | .-. | |
| 7165 | 1376 | TAD PATPTR | /CHECK FOR END OF DEVICE CODES |
| 7166 | 7041 | CIA | |
| 7167 | 1113 | TAD TDEV | |
| 7170 | 7700 | SMA CLA | |
| 7171 | 5357 | JMP PATCH1 | /NOT YET - KEEP GOING |
| 7172 | 6001 | PATCH2, ION | /TURN INTERRUPT BACK ON |
| 7173 | 5750 | JMP 1 PATCH | /AND RETURN TO NORMAL |
| 7174 | 7740 | PATCNT, -40 | |
| 7175 | 7740 | PATINI, -40 | |
| 7176 | 0000 | PATPTR, 0 | |
| 7177 | 6005 | C6005, 6005 | |
| | | \$\$\$\$\$ | |

PDP-8 FLOATING POINT PACKAGE(DEC-08-YQ2B,DEC-08-YQ4B)

Problem in Output Controller when Outputting Zero

There is a problem in the Output Controller of the PDP-8 FLOATING POINT PACKAGE which will cause an incorrect number of digits to be printed when the number being output is zero. The Controller does not always print the correct number of zeros, but the printed result will never be other than zero. Since the Controller is present in FLOATING POINT PACKAGES 2 (two) and 4 (four), the patch which follows should only be implemented by users working with these version -- DEC-08-YQ2B-PB and DEC-08-YQ4B-PB.

The Patch is:

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 5425 | (2214) | 5626 |
| 5426 | (2214) | 7365 |
| 5445 | (2200) | 7000 |
| 7365 | (unused) | 1775 |
| 7366 | (unused) | 7650 |
| 7367 | (unused) | 2044 |
| 7370 | (unused) | 2774 |
| 7371 | (unused) | 2774 |
| 7372 | (unused) | 5773 |
| 7373 | (unused) | 5427 |
| 7374 | (unused) | 5414 |
| 7375 | (unused) | 5572 |

Note: This patch is the same for both packages 2 and 4.

PDP-8 FLOATING POINT PACKAGES 2 and 4 (DEC-08-YQ2B-PB, DEC-08-YQ4B-PB)

Patch to Make Output Controller Recognize Loc. 55 as a Switch Governing the Printing of a Carriage Return/ Line Feed.

The Output Controller in the PDP-8 FLOATING POINT PACKAGE does not correctly recognize location 55 as a switch governing the printing of a CR/LF after output. The switch is correctly recognized in packages 1 and 3. To make packages 2 and 4 recognize the switch, make the following patch: (same for both versions)

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 7207 | (7200) | 1055 |

FPP FORTRAN IV RUN-TIME SYSTEM-FORRTS.FT (V4)

Patch to correct erroneous results from unfilled format fields

In a formatted READ, if rubout is used to delete characters and they are not replaced to fill the format field, an erroneous value results. For example, for a format field F5.2, typing 1.234\ \ produces 1.03. The following fix solves the problem.

Use the program FPIP as follows:

| | |
|----------------------|--------------------------------|
| .R FPIP | Paper tape and editing program |
| *DSK: FORRTS.FT</l\$ | Systems device;\$=altmode |
| R,11 | Read block 11 |
| O,315 | Open relative location 315 |
| <u>7001/5341</u> | Change to 5341 |
| <u>0,341</u> | Open relative loc. 341 |
| <u>0000/1774</u> | Change 341 to 1774 |
| <u>0000/3350</u> | Change 342 to 3350 |
| <u>0000/1114</u> | Change 343 to 1114 |
| <u>0000/3750</u> | Change 344 to 3750 |
| <u>0000/7001</u> | Change 345 to 7001 |
| <u>0000/5316</u> | Change 346 to 5316 |
| W | Write the block |
| E | Exit FPIP |
| ↑C | Return to Command Decoder |

The underlined portions are printed by FPIP and are the current contents of the locations. Note that FPIP is a new OS/8 program whose 2 main functions are to read in paper-tape patches and to permit typing in short fixes (similar to ODT) for the FPP FORTRAN IV files.

FPP FORTRAN IV-LOAD.SV (V13)

Patch to prevent the omission of overlay information

An input line to the loader (LOAD.SV) of just * /O (no input files) causes all preceding overlay information to be disregarded.

The following patch eliminates the problem.

Use OS/8 ODT to add the changes.

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 13152 | 3421 | 745Ø |
| 13153 | 2Ø21 | 5741 |
| 13154 | 3Ø22 | 3421 |
| 13155 | 5741 | 2Ø21 |
| 13156 | Ø | 3Ø22 |
| 13157 | Ø | 5741 |

FOCAL 1969 (DEC-08-AJAE)

Failure to read user programs on a PDP-8/S

FOCAL 1969 sometimes fails to read user generated tape programs via the High Speed Reader on an 8/S. This problem is due to a timing problem in the reader delay loop. The following patch will correct the problem:

Change location 6322 after executing the dialogue:

OLD CONTENTS

7040 (CMA)

NEW CONTENTS

1120 (TAD M5)

Note: The dialogue attempts to reduce the time-out delay by changing TAD M20 to CMA, but this is not correct.

PDP-8 FOCAL LIBRA System (Multi-user overlay)

Patch to accept more common variables

FOCAL LIBRA can be modified to accept more common variables by using the following patch after the initial dialogue:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 0035 | 4560 | 4553 |
| 6362 | 4565 | 4560 |
| 6363 | 7773 | 7771 |
| 6364 | 0005 | 0007 |

FOCAL 1969 (DEC-08-AJAE)

Patch to correct Input-Buffer-Overflow

To avoid input-buffer-overflow while reading in a tape,
remove the echo using the following patch:

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 2163 | 4551 | 7000 |

To restore the echo, insert the old contents of location 2163.

FOCAL 1969 (DEC-08-AJAE)

Patch to correct one of the SINE Constants

To correct one of the SINE Constants, use the following patch:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 5333 | 2401 | 2501 |

PDP-8 FOCAL (DEC-08-AJAE-PB) with 8K Overlay

Patch to 8K FOCAL with DISK/DEctape Monitor

After loading the 8K Overlay use the following patch if you are having problems saving, restoring or running 8K FOCAL Programs with the DISK/DEctape Monitor System.

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 7525 | 6213 | 6212 |

FOCAL 1969 (DEC-08-AJAE)

Note to users of FOCAL

To read data tapes on the TTY reader, use the following patch to remove the interrupts:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 63 | 2676 | 1354 |
| 64 | 2666 | 2414 |
| 2732 | 6001 | 5336 |
| 2762 | 6046 | 7000 |

To allow use of the L command while the interrupt is off, the following patch should also be made:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 7522 | 1016 | 5325 |

Note: These patches disable high-speed readers unless the following patch is also made:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 6324 | 1037 | 6011 |
| 6325 | 7700 | 7410 |

PDP-8 FOCAL '69 (DEC-08-AJAE)

Patch to use LINC-8 display (ON THE LINC-8 ONLY)

To use the LINC-8 display with FOCAL '69 use the following code which should be assembled with PAL III. This binary tape must be loaded after loading FOCAL. This patch is not intended for use on the PDP-12.

```

/DISPLAY PATCH FOR FOCAL 69
START=4500
/VALUE OF START IS DETERMINED BY TYPING L TO FOCAL
AFTER
/INITIAL DIALOGUE. THE LAST VALUE TYPED MINUS 31 OR
GREATER
/THAT DOES NOT CROSS PAGE BOUNDARY
XDYS=1142
*XDYS +1
1143      3757      DCA I X
*XDYS+11
1153      6167      6167
1154      7200      CLA
1155      5756      JMP I PATCH
1156      4551      PATCH,LINDIS
1157      4550      X,SAVX
*BOTTOM
0035      4547      START -1
*START
4550      0000      SAVX,0
4551      1371      LINDIS,TAD LINCPC /LINC DISPLAY ROUTINE
4552      6165      6165
4553      7200      CLA
4554      1775      TAD I SAVFOC
4555      3374      DCA SAVLOC
4556      1350      TAD SAVX
4557      3775      DCA I SAVFOC
4560      1376      TAD ENABL
4561      6141      6141
EFUN3I=136
4562      1377      TAD TWLV
4563      6141      6141
4564      7000      NOP
4565      7200      CLA
4566      1374      TAD SAVLOC
4567      3775      DCA I SAVFOC
4570      5536      JMP I ENFUN3I /RETURN TO FOCAL
4571      4572      LINCPC,NEXT
4572      0141      NEXT,141 /LINC CODE DISPLAY 1
4573      0000      0 /LINC HALT
4574      0000      SAVLOC,0
4575      4001      SAVFOC,4001
4576      0010      ENABL,10
4566      0002      TWLV,2
BOTTOM=35

```

| | |
|---------|------|
| BOTTOM | 0035 |
| EFUN3I | 0136 |
| ENABL | 4576 |
| LINCPCP | 4571 |
| LINDIS | 4551 |
| NEXT | 4572 |
| PATCH | 1156 |
| SAVFOC | 4575 |
| SAVLOC | 4574 |
| SAVX | 4550 |
| START | 4550 |
| TWLV | 4577 |
| X | 1157 |
| XDYS | 1142 |

PDP-8 FOCAL '69 Machine Language Subroutine

FNEW functions must be written in assembly language in patch form and loaded over the FOCAL program. These may be loaded after FOCAL has successfully loaded, and do not affect the "FOCAL" program the user has previously entered.

Subprogram to operate on an indefinite number of arguments.

Called from FOCAL by: SET = FNEW (A,B,C,...,N); TYPE Z where A,B,etc. have been previously defined and are to be operated upon to yield Z. Subprogram must be assembled as a patch and loaded over FOCAL.

START = (SEE NOTE)

*BOTTOM

FNEW-1

*FNTAB+14

FNEW

*START

FNEW,TAD LIST-1

DCA 16

/PUT ADDRESS OF LIST INTO AUTOINDEX REG.

DCA KOUNT

ISZ KOUNT

JMS I INTEGER

/FETCH NEXT ARGUMENT

DCA I 16

/STORE IN LIST

PUSHJ

ARG

/GET NEXT CHARACTER

SKP

/RETURN IF NOT A COMMA

JMP FNEW+3

/RETURN IF COMMA WITH NEXT ARG. IN FLAC

CLA CLL

USER CODING TO OPERATE ON N ITEMS

.

STORED IN LIST. KOUNT CONTAINS THE NUMBER

.

OF ITEMS,N. THE RESULT MUST BE STORED

.

IN INTEGER FORM IN ANS.

CLA CLL

TAD ANS

/CODING TO SET ANS INTO FLAC

CLL RAR

DCA FLAC+1

RAR

DCA FLAC+2

TAD C14

DCA FLAC

JMP I EFUN3I

/CHECK FOR RIGHT PAREN,NORMALIZE FLAC,RETURN

C14,14

KOUNT,0

ANS,0

LIST-1

LIST,0

0

.

.

.

/AS LONG AS ARGUMENT LIST WILL BE

FOCAL Subroutines (Continued)

```

START = (SEE NOTE)
BOTTOM
FNEW-1
*FNTAB+14
FNEW
*START
FNEW,DCA SUM           /CLEAR SUM
    JMS I INTEGER      /BRING FIRST (NEXT) CHAR. INTO ACCUMULATOR
    TAD SUM
    DCA SUM             /UPDATE SUM
    PUSHJ
    ARG                /GET NEXT CHAR.
    SKP                /RETURN IF NOT A COMMA
    JMP FNEW+1         /RETURN IF COMMA WITH NEXT ARG IN FLAC
    CLA CLL
    TAD SUM            /FINAL SUM SET INTO FLAC FOR
    CLL RAR           /RETURN FROM SUBPROGRAM
    DCA FLAC+1
    RAR
    DCA FLAC+2
    TAD C14
    DCA FLAC
    JMP I EFUN3I      /CHECK FOR RIGHT PAREN,NORMALIZE FLAC,RET.
C14,14                /FLAC,RETURN
SUM, 0
ARG, TAD CHAR        /CODING TO FETCH NEXT CHAR.
    TAD MCOMMA       /RETURN TO CALL+3 (OR CALL+2)
    SZA CLA         /IF CHAR IS (IS NOT) A COMMA
    JMP .+4 .
    PUSHJ
    EVAL-1
    IAC
    POPJ
MCOMMA,7524

INTEGER=53           /THESE LOCATIONS MAY VARY
PUSHJ-4540          /WITH THE VERSION OF FOCAL
EVAL=1613           /FOR FOCAL '69 DEC-08-AJAE-PB
FLAC=44             /THESE DEFINITIONS APPLY
CHAR=66
EFUN3I=136
BOTTOM=35
FNTAB=374

```

NOTE: CODING MAY OCCUPY CORE FROM 3220-4577. THIS AREA IS OCCUPIED BY STORAGE LISTS AND PUSH-DOWN LISTS, SO CODING SHOULD OCCUPY THE TOP OF THIS REGION IN CORE SO AS NOT TO SEVERELY LIMIT THE WORKING STORAGE AREA. IF FEXP, FLOG, AND FATN ARE DELETED, THE USER HAS AVAILABLE LOCATIONS 3220-5177. IF IN ADDITION TO ABOVE, FSIN AND FCOS ARE DELETED, THE USER HAS AVAILABLE 3220-5232. TO DETERMINE THE VALUE FOR "START" USE THE "L" COMMAND IN FOCAL. START=LAST VALUE PRINTED MINUS LENGTH OF PATCH STARTING AT *START.

FOCAL Subroutines (Continued)

ARG, TAD CHAR /CODING TO FETCH NEXT CHAR.
TAD MCOMMA /RETURN TO CALL+3 (CALL+2)
SZA CLA /IF CHAR. IS (IS NOT) A COMMA
JMP .+4
PUSHJ
EVAL-1
IAC
POPJ
MCOMMA,7524

INTEGER=53 /THESE VALUES MAY VARY
PUSHJ=4540 /WITH THE VERSION OF FOCAL USED
EVAL=1613 /FOR FOCAL '69 DEC-08-AJAE-PB
FLAC=44 /THESE DEFINITIONS APPLY
CHAR=66
EFUN3I=136
BOTTOM=35
FNTAB=374

NOTE: CODING MAY OCCUPY UPPER END OF STORAGE USE FOR TEXT
AND PUSH-DOWN LISTS. THIS AREA OCCUPIES CORE LOCATIONS:

| | |
|-----------|------------------------------|
| 3220-4577 | with all function |
| 3220-5177 | with FEXP,FLOG,FATN, |
| 3220-5232 | FSIN,FCOS and above deleted. |

TO DETERMINE THE VALUE FOR "START" USE THE "L" COMMAND IN
FOCAL. "START" = LAST VALUE PRINTED MINUS LENGTH OF PATCH
STARTING AT *START.

On the following page is a subprogram which sums an indefinite number of
arguments. It is called from FOCAL by:
SET Z = FNEW (A,B,C,.....,N) :TYPE Z where A,B, etc. have been previously
defined. This subprogram must be assembled as a patch loaded over FOCAL.

FOCAL 1969 (DEC-08-AJAE)

Programming Note

"TYPE #" issues a carriage return plus a FORM feed to allow the carriage return to get back to the left margin. On certain models of teletypes, multiple line feeds are generated upon reception of a form feed. The following patch to replace form feed (214) with a null character (216) should be used if you have this type of TTY:

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 125Ø | 7ØØ1 | 7Ø4Ø |

FOCAL 1969 (DEC-08-AJAE)

Patch to correct rounding error

A rounding error has been discovered in FOCAL where a remainder of 4 in the first digit discarded causes the last digit printed to be rounded upwards. To correct this problem, the following patch should be used:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 5525 | 0005 | 0004 |

FOCAL 1969 (DEC-08-AJAE)

Patch to allow automatic restart with L command

The following patch will automatically restart FOCAL when using the L command (upon completion of the four locations printout).

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 7526 | 5504 | 5177 |

Note: This patch must be used when the Disk Monitor System is not in use.

FOCAL 1969 (DEC-08-AJAE) with CLINE & PLOTR

Patch to correct circle

If the radius of a circle being plotted is an exact power of 2, it is mistakenly interrupted as Ø and a string of dots is drawn in place of the circle.

The following patch should be used (according to the overlay in use) :

For CLINE:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 5Ø6Ø | 1Ø46 | 1Ø45 |

For PLOTR:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 5Ø32 | 1Ø46 | 1Ø45 |

FOCAL 1969 (DEC-08-AJAE)

Patch for use on LAB-8

A problem has been discovered when using FOCAL on a LAB-8 system. A possible enabling of the clock interrupt may occur. To prevent this, the following patch should be made before the initial dialogue:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 4377 | 6012 | 7000 |

FOCAL 69 (DEC-08-AJAE and DEC-08-AJ6E)

Patch to FOCAL-69 LIBRA on an RFØ8 disk.

Location Ø15Ø on field Ø is being overlaid by DISKIN accidentally. To correct this problem:

1. Load FOCAL into field 1
2. Load LIBRA into field Ø
3. Change location 2611 in field Ø from 5612 to 74Ø2
4. Start at 2ØØ
5. Answer all the questions and when the computer halts change location Ø15Ø in field Ø from a 3Ø53 to a 6641
6. Start at 2ØØ

PDP-8 FOCAL'69 and QUAD/LIBRA

Saving FOCAL'69 and QUAD/LIBRA on a DIAL LINctape

The following is the procedure for loading FOCAL'69 and its overlays (QUAD/LIBRA) on a DIAL LINctape as one binary so it may be loaded into core directly via the LO command.

| | |
|-----------------------|--|
| Start LAP6-DIAL-MS | (LS=701; RS=7310) |
| →ZE | (zero binary working area) |
| →PI | (load PIP) |
| B | (binary mode) |
| T | (input - TTY) |
| L0; FOCAL 4K | (output - LINctape 0) |
| D | (CNTL D - return to LAP6-DIAL after reading in both parts of FOCAL) |
| →ZE | (zero binary working area) |
| →PI | (load PIP again) |
| B | (binary mode) |
| T | (input - TTY) |
| L0; QUADPT08 | (output - LINctape 0) |
| D | (CNTL D - return to LAP6-DIAL after QUAD overlay is saved) |
| →ZE | (zero binary working area) |
| →AB 0000,1,FOCAL 4K,0 | (this will add back the binary of FOCAL and sets the bit map so it will be loaded into FIELD 1) |
| →AB QUADPT08,0 | (this adds the binary for QUAD to the FOCAL binary and sets up the whole bit map) |
| →SB ANYTHING,0,P | (This will save the two binaries as one file and when loaded will start in 8 mode, location 200) |

Notes:

LAP6-DIAL-MS will not load the last page in Field 1 (loc. 17600 - 17777) also, LIBRA stores some data into those locations. In order to load a LAP6-DIAL file (FOCAL plus LIBRA) which uses this last page, you must use the DIAL-V2 Loader supplied on LINctape DEC-12-SE2E-UO, not the DIAL-MS Loader. This does not apply to QUAD since it does not use that last page of core.

Please see article FOCAL-14 for a patch to LIBRA RF08 version.

When you PIP a binary program onto a LINctape/Disk, the binary working area must be zeroed first, since PIP stores the file there before it transfers it into its stored area. Therefore, when you later do an ADD Binary everything will work properly. (This is described in the LAP6-DIAL manual, DEC-12-SE2D-D, pages 4-5 to 4-7).

FOCAL'69

Problem when running FOCAL'69 with API on PDP-12

FOCAL'69 (DEC-08-AJAE), while executing its initialization code, issues a 6762 (clear TC01 status register A) which is also used in the new PDP-12 API (Automatic Priority Interrupt) hardware. Therefore, if you are running on a PDP-12 with API this instruction must be NOP'ed.

To correct this problem, do the following:

- 1) Set left switches = 0200
- 2) Set F stop key
- 3) →LO FOCAL4K,0 (from DEC-12-SE2E-UO)
- 4) When the machine halts, set left switches = 4376; right switches = 7000; press the fill key
- 5) Make sure the machine is in PDP-8 mode, set the left switches = 0200
- 6) Press start left switches switch

To correct the DIAL System Tape (DEC-12-SE2E-UO) change the following tape block:

| <u>BLOCK</u> | <u>WORD</u> | <u>FROM</u> | <u>TO</u> |
|--------------|-------------|-------------|-----------|
| 237 | 376 | 6762 | 7000 |

```

/PATCH TO FOCAL 1969 (AJAE)
/TO CURE BUFFER OVERFLOW PROBLEM (PDP-8/E ONLY)
/MAKES USE OF EXTRA 8/E KEYBOARD IOT (KCF)
/SO MAKING IT IMPOSSIBLE FOR OVERFLOW TO OCCUR
/PATCHES FOCAL INTERRUPT PROCESSOR
/LISTING PAGE 44
/AND FOCAL TTY INPUT ROUTINE
/LISTING PAGE 45

```

```

OPATCH=2414
INBUF=34
P177= 106
MBREAK= 2602
C200= 123
EXIT= 2646
RECOVR= 2740
SIN=2662
INRET=2675
KCF=6030

```

```

*2627
/PATCH TO INTERRUPT PROCESSOR

```

```

2627 6034 KRS /INPUT CHARACTER
2630 6030 KCF /CLEAR FLAG
2631 0106 AND P177 /IGNORE BIT 8
2632 7450 SNA /BLANK?
2633 5245 JMP EXIT-1 /YES-GO INITIATE NEXT READ
2634 1123 TAD C200 /SET BIT 8 ON
2635 3262 DCA SIN
2636 1262 TAD SIN
2637 1202 TAD MBREAK
2640 7650 SNA CLA /CTRL C?
2641 5340 JMP RECOVR /YES
2642 1262 TAD SIN
2643 3034 DCA INBUF /STORE CHARACTER
2644 7410 SKP
2645 6032 KCC /INITIATE NEXT READ- CHAR. WAS A BLANK
*2673
2673 5674 JMP I .+1 /PATCH TO INPUT ROUTINE
2674 2414 OPATCH
*OPATCH
2414 3034 OPATCH DCA INBUF /CLEAR INPUT BUFFER
2415 6032 KCC /INITIATE NEXT READ
2416 1621 TAD I XOUTL /GET CHARACTER
2417 5620 JMP I .+1 /RETURN TO INPUT ROUTINE
2420 2675 INRET
2421 2676 XOUTL, 2676
$

```

FOCAL 1969 (DEC-08-AJAE)

Optimum use of the PDP-8/E

The following patch uses the KCF instruction of the PDP-8/E to eliminate input buffer overflow. The patch should be assembled with PAL III so that the binary can be loaded easily each time FOCAL is loaded.

PDP-12 FOCAL-12

Patch to allow FOCAL-12 to save files on a 1600₈ block LINtape

To allow FOCAL-12 (on LINtape DEC-12-SE2E-U0) to save files on a 1600₈ block LINtape, make the following changes to the binary:

FOCAL-12 (DEC-12-AJAA)

23₈ rd block of the actual binary (starting block in index + 23₈)

| <u>WORD</u> | <u>FROM</u> | <u>TO</u> |
|-------------|-------------|-----------|
| 353 | 6777 | 6177 |

24₈ th block of the actual binary (starting block in index + 24₈)

| <u>WORD</u> | <u>FROM</u> | <u>TO</u> |
|-------------|-------------|-----------|
| 161 | 7000 | 6000 |

NOTE: Please notice the above change from header block to starting block number, when you display the index of a LAP6-DIAL tape.

PDP-12 FOCAL-12

Note on FADC instruction

It is important to remember that FOCAL-12's FADC instruction references the AD-12 channels as if they were numbered decimally.

Therefore, channel 10 = FADC (8), channel 11 = FADC (9), etc.

PDP-8 4K FORTRAN Compiler (DEC-08-AFC1)

Procedure to restore locations destroyed by SYMBOLPRINT (DEC-08-AFA2)

The PDP-8 4K FORTRAN compiler is designed to be restarted for successive compilations and not require reloading after compiling each source program. The PDP-8 FORTRAN Symbolprint program, which is read in over the compiler to use the information left in its tables and counters, resides in the compiler's input statement so that this restart capability will not be lost.

However, the use of Symbolprint imposes two restrictions on the restart facility:

1. The compiler must be reloaded after each use of Symbolprint if the user chooses the switch option to indicate that his FORTRAN source program contains DECTape I/O statements. This is a design restriction due to lack of free space in the compiler. A portion of the additional code to compile DECTape I/O statements is destroyed by Symbolprint.
2. The contents of three locations in the compiler are changed by Symbolprint during execution. They must be restored or subsequent compilations will yield incorrect results, possibly without producing any error messages.

The locations and their proper contents are:

| LOCATION | CONTENTS |
|----------|----------|
| 10 | 0000 |
| 11 | 0603 |
| 12 | 0604 |

These values must be restored by the following procedure after running Symbolprint and before starting the next compilation.

| | | |
|-----------------------------|---------|--------------|
| Set switch register to 0010 | depress | LOAD ADDRESS |
| " " " " 0000 | " | DEPOSIT |
| " " " " 0603 | " | DEPOSIT |
| " " " " 0604 | " | DEPOSIT |

Restart the compiler as usual.

PDP-8 4K Fortran Compiler and Operating System
(DEC-08-AFC1-PB and DEC-08-AFC3-PB)

Patch to Compiler Input Overflow and Input Conversion Limitations

The library version of 4K Fortran Compiler (DEC-08-AFC1-PB) uses a mask of 7400 to check for overflow in the high order mantissa word during floating point input conversion. The correct mask is 7600. To patch the compiler, load it using the binary loader, then DEPOSIT 7600 into location 5515 (old contents of 5515 was 7400). The compiler may now be started as usual.

Users should not attempt to input floating point constants of more than six decimal digits, either in the Fortran source program or via the run-time ACCEPT statement, as in general such constants will not be handled correctly. The results of including a constant of the form XXXXXXXX. in the source program are unpredictable, while a constant of the form .XXXXXXXXE+XX will be represented correctly to six decimal places. Attempting to input a constant of the form XXXXXXXX. via the run-time ACCEPT statement, may cause an error in the calculation of the Exponent, while inputting the same constant as XXXXXX.XE+1 via the ACCEPT statement, will cause the exponent to be calculated correctly, and the mantissa to be correct to 6 decimal places. Users should be especially aware of the fact that different representations of the same constant (7 or more digits) may cause different results when these representations are input to the compiler, or when input via the run-time ACCEPT statement.

4K FORTRAN COMPILER (DEC-08-AFC1-PB)

Problem with mode of variables.

The current version of the 4K FORTRAN COMPILER (DEC-08-AFC1-PB) is inconsistent in its handling of variables when the mode (integer or floating point) associated with the variable name differs from the mode specification in a FORMAT statement. Several examples will illustrate this inconsistency:

```
A) 1;  FORMAT (E)
      ACCEPT 1,I
      TYPE  1,I
```

In the above example, if the number 1.23 followed by a terminator is typed in response to the ACCEPT statement, the decimal part will be lost and the number will be stored as an integer on input (only one word of storage will be allocated the variable I - the number will be input as a floating point number, but then it will be converted to fixed point and stored as an integer). On output, the print-out will be:

```
+0.100000E+1
```

so the integer mode associated with the variable name I has taken precedence over the format specification on input but not on output.

B) In the case

```
1;  FORMAT (I)
      ACCEPT 1,A
      TYPE  1,A
```

the integer mode specification in the FORMAT statement takes precedence on input and output.

C) Inputting the number 1.33 followed by a terminator to the following:

```
1;  FORMAT (I,E)
      ACCEPT 1,A,B
      TYPE  1,A,B
```

will yield as output: +1 +0.330000E+2

for the decimal point is recognized only as a terminator of the input for the integer variable A (FORMAT statement has precedence as in example B, above), and 33 is taken as input for the floating point variable B. Had the program looked as follows:

```
1;  FORMAT (E,I)
      ACCEPT 1,I,J
      TYPE  1,I,J
```

then inputting 1.33 followed by a terminator would not satisfy the ACCEPT statement, for 1.33 would be read in as a floating point number, then converted to fixed point and stored as integer +1 (as in example A), the operating system would then still be waiting for more input; if the number 2 is now typed, followed by a terminator, the ACCEPT statement would be satisfied and output would be as follows:

+0.100000E+1 +2

(again output for the variable I reacts as described in example A).

PDP-8 4K FORTRAN COMPILER AND SYMBOLPRINT
(DEC-08-AFCl-PB and DEC-08-AFA2-PB)

Problem with SYMBOLPRINT typeout of highest address used
for storage of interpretive code

4K FORTRAN SYMBOLPRINT types out a list of symbols and corresponding values and also types out the upper limit of core-storage for the compiler-generated interpretive code, and the lower limit of core used for data storage. The printed value of the first of these numbers, the upper limit of interpretive code, is higher than the actual value of the limit. This is due to a problem in the FORTRAN COMPILER. To have the correct value printed by SYMBOLPRINT, make the following patch to the COMPILER before compiling the FORTRAN source program:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 4330 | (4200) | 4251 |

Suggested method for saving FORTRAN-D object programs.

The following method for saving FORTRAN-D object programs enables the user to call his program with the FORTRAN-D operating system as a Monitor system program.

1. Compile the FORTRAN-D source program as usual.
2. Load and run the compiler output under FOSL.
3. At the end of a successful run, control will return to the Monitor. The user should then call FOSL to reload the compiler output as if to run the program again.
4. When FOSL has loaded the program (and subroutines, if any) it will type

READY

↑

The user should type CONTROL C (↑C) to return to the Monitor.

5. A core image of the user's program in FOSL may not be saved on disk as a system program by typing

SAVE NAME!0-7577;5043

Note that the starting address must be 5043.

6. When the Monitor has returned control to the user, the core image may be called at any time as a system program. On starting, the program will type

READY

↑

7. CONTROL P (↑P) will initiate execution. When execution is complete the program will type "!" and return to the Monitor.

Users who run FORTRAN-D with binary subroutines will find this method especially time saving.

PDP-8 FORTRAN-D (DEC-D8-AFA2)

Patch to correct problem in floating point input routine.

The floating point input conversion routine in .FT. fails to correctly compile decimal numbers which have more than six significant digits and are above a certain magnitude. This problem results from an error in masking to check whether accepting another decimal digit will cause an overflow. The mask is now set at 7400 (octal) and, therefore, applies to the top four bits of the double precision word. However, the top five bits should be interrogated as the leading sign bit must not be changed. To correct this situation, the mask at location 4715 (octal) should be set to 7600 (octal). A similar conversion routine in the operating system does use a mask of 7600. This patch will be implemented in the next revision of FORTRAN-D. Until such time see the article DISK MONITOR SYSTEM 4 for a description of how to make the patch to location 4715 of the Compiler (.FT.).

PDP-8 FORTRAN-D (DEC-D8-AFA3 and AFA4-PB)

Patch to allow non-system DECTape I/O.

In order to perform I/O on a DECTape other than that being used as the system device, it is necessary to make the patch given below to FOSL and .OS. of the Fortran-D Operating System.

Without this patch, I/O can only be handled via the teletype, the high speed reader/punch, or the system device. With the patch, I/O is enabled on DECTape unit 7 rather than on the DECTape specified as the system device.

The procedure for loading the Operating System, patching it, and saving it is outlined as follows.

1. Load the operating system loader (FOSL) using Loader in one pass with a 7636 argument to ST=.

```
.LOAD ↓  
*IN-R: ↓  
*  
*OPT-1  
*ST=7636 ↓  
↑↑
```

After FOSL has been completely loaded, the Loader will halt at location 7636 enabling you to enter the following patch through the switch register.

Instructions to allow reading from DECTape 7.

| <u>LOCATION</u> | <u>NEW CONTENTS</u> |
|-----------------|--|
| 166 | 2700 |
| 2700 | 1377 |
| 2701 | 3766 |
| 1224 | 703 /DECTape unit 7 input (603 for input from unit 6) |

Instructions to allow writing onto DECTape 7.

| | |
|------|--|
| 2702 | 1375 |
| 2703 | 3774 |
| 2704 | 5773 |
| 1324 | 705 /DECTape unit 7 output (605 for output to unit 6) |

Storage cells for the above changes:

| <u>LOCATIONS</u> | <u>NEW CONTENTS</u> |
|------------------|---------------------|
| 2773 | 263 |
| 2774 | 5353 |
| 2775 | 705 |
| 2776 | 5331 |
| 2777 | 703 |

Once the patch has been made, load address 7600 and press START to return to the monitor. FOSL may then be saved in the following manner.

```
.SAVE FOSL! 0-1577,2700;200
```

2. The operating system interpretive and arithmetic package (.OS.) should now be loaded by using the Loader in one pass and specifying 7636 as the argument to ST=.

```
.LOAD  
*IN-R:  
*  
*OPT-1  
*ST=7636  
↑↑
```

The loader will again halt at location 7636 and the following patch must be made to allow writing on DECTape 7.

| <u>LOCATIONS</u> | <u>NEW CONTENTS</u> |
|------------------|---------------------|
| 5155 | 1377 |
| 5177 | 703 |

When the patch has been made, load address 7600 and press START. Control will return to the monitor and you may now save .OS. as .SAVE .OS.! 0-5177; The following page shows an example program and its results to prove this new method of DECTape I/O.

*L

```
DEFINE DECTAPE
WRITE 3,9
FAC=1
DO 10 N=1,20
WRITE 3,20,N,FAC
EN=N+1
FAC=EN*FAC
10 CONTINUE
STOP
20 FORMAT (,E)
9 FORMAT ("FACTORIAL PROGRAM"/)
END
```

*

.FORT

*OUT-S:TE

*

*IN-S:TES1

*

↑

/COMPILATION FINISHED. CNTRL C WAS THEN TYPED

.FOSL

*IN-S:TE

*

*OPT-S

*OUT-D7:IO

/DECTAPE 7 MUST ALWAYS BE SPECIFIED FOR I/O

*

*IN-

*

*READY

↑

/PROGRAM WAS EXECUTED BY TYPING CNTRL P

!

.PIP

/CALLED IN PIP TO LIST THE FILE WRITTEN ON TAPE 7

*OPT-A

/BY OUR FORTRAN PROGRAM

*OUT-T:

*

*IN-D7:IO

*FACTORIAL PROGRAM

```
1 0.100000E+1
2 0.200000E+1
3 0.600000E+1
4 0.240000E+2
5 0.120000E+3
6 0.720000E+3
7 0.504000E+4
8 0.403200E+5
9 0.362880E+6
10 0.362880E+7
11 0.399168E+8
12 0.479001E+9
13 0.622702E+10
14 0.871782E+11
15 0.130767E+13
16 0.209227E+14
17 0.355686E+15
18 0.640236E+16
19 0.121644E+18
20 0.243289E+19
```

*OPT-

PDP-8 FORTRAN-D (DEC-D8-AFAL-PB)

Problem with storage of SAM BLOCK numbers.

In Disk Fortran both the Compiler and the Operating System exist as two part tapes which are stored on the Disk as four unique files. The Compiler Loader, or driver, is saved on the system device under the file name FORT while the main body of the Compiler is saved under the file name .FT. and is located and loaded by FORT whenever necessary. Similarly, the Operating System loader, or driver, is saved under the file name FOSL while the main body of the Op. Sys. is saved under the file name .OS. and it is located and loaded by FOSL whenever necessary.

In order to locate their associated files, FORT and FOSL do a directory look up for the required name (FORT will look up .FT. and FOSL looks up .OS.). In doing this both FORT and FOSL assume that the first SAM BLOCK number is stored in the third word of each DN (directory name) block. The Monitor, however, stores this number in the third word of the first DN block only (block 177).

If .FT. is not one of the first twenty-five (decimal) files saved on the system, its Directory Name entry will not be in the first DN block. When FORT finds the DN entry for .FT. it will assume the third word of the same DN block to contain the block number of the first SAM BLOCK when in truth it does not. FORT will therefore be unable to load .FT. and the compiler will not run. A similar situation is encountered by FOSL if .OS. is not among the first 25₁₀ files saved.

To correct this situation both FORT and FOSL should be made to use a constant 200 as the first SAM BLOCK number (which it always is). This is done as follows:

Load the Fortran Compiler Loader (FORT) and change locations:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 1456 | 1672 | 1272 |
| 1472 | 7402 | 0200 |

Save the Compiler Loader as usual. Load and save the Compiler main body as usual. Load the Fortran Operating System Loader (FOSL) and change:

| | | |
|------|------|------|
| 1056 | 1672 | 1272 |
| 1072 | 4602 | 0200 |

Save the OP. Sys. Loader as usual. Load and save the OP. SYS. main body as usual.

Both the Compiler and the Operating System will now function properly no matter which DN block they are entered in when saved.

(See the article DISK MONITOR SYSTEM 4 for a complete description of how to patch a system program, also see the Disk Monitor Manual DEC-D8-SDAB-D.)

PDP-8 FORTRAN-D (DEC-D8-AFA2)

Patch to correct two error conditions during compilation time.

The following two error conditions are not properly flagged during compilation time.

1. In a GO TO statement the absence of a comma between the closing parenthesis and the operand may or may not produce an error message, depending on the second character of the variable. If this character is a floating point designator, the error will be flagged as such. But if it is a fixed point designator, no error will be detected.

The following patch will correct this problem by adding a new syntax error code 02.

| | | | |
|------|------|--------------------|---------------------|
| 6024 | 5357 | JMP PATCH1 | |
| 6157 | 1501 | PATCH1,TAD I Z END | /GET NEXT CHARACTER |
| 6160 | 2101 | ISZ Z END | /INDEX TO NEXT |
| 6161 | 1367 | TAD MCOMMA | /CHECK FOR |
| 6162 | 7650 | SNA CLA | /COMMA |
| 6163 | 5225 | JMP BACK | /O.K., CONTINUE |
| 6164 | 4454 | ERROR | /NOT FOUND |
| 6165 | 4002 | 4002 | /SYNTAX ERROR |
| 6166 | 5446 | JMP I Z NEWL | /GET NEXT LINE |
| 6167 | 7524 | MCOMMA,-254 | /COMMA |

2. If an apostrophe (single quote) accidentally appears in any statement, an error message (usually 14, system overflow) may or may not be generated depending on where the apostrophe appears. The apostrophe at the end of a line signifies a continuation of the statement to the next line. (Maximum number of characters must not exceed 128.) However, if it appears anywhere except before the carriage return at the end of a line it should be flagged as an illegal character (code 12).

The following patch corrects this problem:

| | | | |
|------|------|----------------|----------------------------|
| 0277 | 5365 | JMP PATCH | |
| 0365 | 1363 | PATCH TAD M215 | /CHECK TO SEE IF NEXT |
| 0366 | 7650 | SNA CLA | /CHAR IS A CARRIAGE RETURN |
| 0367 | 5217 | JMP FILB | /YES, O.K., CONTINUE |
| 0370 | 2145 | ISZ Z STMT | /NO, INDEX STATEMENT NO. |
| 0371 | 7000 | NOP | |
| 0372 | 4454 | ERROR | /SINGLE QUOTE IS |
| 0373 | 4012 | 4012 | /ILLEGAL CHARACTER |
| 0374 | 5342 | JMP OVFL+4 | /IGNORE REST OF STATEMENT |

PDP-8 FORTRAN-D COMPILER (DEC-D8-AFA2-PB)

Notice of temporary restriction in Subscript Expressions

Subscript expressions which appear in input/output statements, such as:

```
READ 3,100, LIST (expression)
```

```
WRITE 2,77, PACK (expression)
```

may only be of the form (V) , (C) , $(V+C)$ or $(V-C)$, where V is a simple integer variable and C is an unsigned integer constant.

Notice that more elaborate subscript expressions may be used outside of I/O statements, permitting the user to redefine the above sequence in a manner such as:

```
L=(expression 1)
K=(expression 2)
READ 3,100, LIST (L)
WRITE 2,77, PACK (K)
```

or even:

```
LL=LIST (expression)
KK=PACK (expression)
READ 3,100, LL
WRITE 2,77, KK
```


PDP-8 8K FORTRAN COMPILER (DEC-08-A2B1-PB)

Problem with labelled FINI statements

There is a problem in the 8K Fortran Compiler with respect to labelled FINI statements. The current version of the compiler (DEC-08-A2B1-PB) will correctly handle a label on a FINI statement if that statement is the object of a DO statement, but not if it is the object of an IF or GO TO statement. In the latter cases, the compiler will not generate a label for the FINI statement and the label will appear as undefined in the SABR symbol table listing. The following patch to the compiler will correct this problem:

| <u>FIELD</u> | <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|--------------|-----------------|---------------------|---------------------|
| 1 | 2665 | 1372 | Ø572 |
| Ø | Ø572 | unused | 4576 |
| Ø | Ø573 | unused | 764Ø |
| Ø | Ø574 | unused | 551Ø |
| Ø | Ø575 | unused | 4525 |
| Ø | Ø576 | unused | 5777 |
| Ø | Ø577 | unused | 6321 |

LAB-8 ADVANCED AVERAGER

Note on running the Advanced Averager from PS/8

Because PS/8 operates differently than the disk monitor and other monitor systems, it is necessary to change the Advanced Averager saving and loading procedure when running under PS/8. PS/8 does not leave all areas of core intact when a program is loaded. Since the Advanced Averager depends upon blocks of core being untouched between sections, it is necessary to insure the integrity of all core other than that which receives the new program.

The following is presented as a means of preserving core between sections. It is not the only method and user solutions are encouraged. Unless an RK08, 800K word disk is the system device, it is suggested that the user run the Advanced Averager from the disk monitor system.

To run the Advanced Averager from PS/8, save all sections of the program on disk using PIP with the /B option. Load the first section with ABSLDR (/G=600). At the end of this section monitor returns. Now, all the areas of core not used by monitor must be saved and reloaded for the following section.

```
.SAVE SYS:CORE 0-7577, 1000-17577
```

With ABSLDR, load CORE.SV using the /I option, then load the next section of the Advanced Averager using the /G option.

Follow this core save-reload procedure prior to the loading of each section and all will work properly.

LAB-8 BASIC AVERAGER

Patch to correct problem with control R

Note this patch is not applicable to the LAB8/e

When using a LAB-8 and the programs Basic Averager (DEC-LB-U21B-PB) and Basic Averager Control Tape (DEC-LB-T21A-PB), the user may encounter the following problem. Sampling one channel and doing a single sweep signal average, will produce the proper display. However, adding to it with a control R (↑R) may produce a stair step pattern on the scope instead of the new averaged signal. The following patch eliminates this problem:

| | |
|------------|-----------|
| 6617/ 4620 | JMS I .+1 |
| 6620/ 0200 | 200 |
| 200/ 0 | 0 |
| 201/ 3161 | DCA 161 |
| 202/ 3160 | DCA 160 |
| 203/ 6335 | XRIN XRCL |
| 204/ 7200 | CLA |
| 205/ 2200 | ISZ 200 |
| 206/ 5600 | JMP I 200 |

LAB-8/e DAQUAN

Tape Problem

Because DAQUAN program tape (DEC-LBOU8ØB-PB) was assembled without the needed floating point package, it will not run. A new tape is being generated, and as soon as possible, the Program Library will be updating all customers who received their machines after September 1, 1971.

LAB-8/e BASIC-RT

Serious problem reported in BASICE.27

Occasionally, when a user types a control C, BASIC will malfunction possibly with no indication of trouble. The conditions necessary to produce this error are time dependent, and therefore may never be noticed. The cause is failure to clear a flag when control C is typed.

To temporarily correct this problem, after BASIC is loaded, change location 7160 in field 0 from a 0776 to a 7756. This will completely solve the problem. However, the "LIST*" command must not be used if this patch is inserted.

If a LIST* command is given, BASIC will not reset the flag and all output will have additional fill characters after the carriage return-line feed.

This problem will be solved in future revisions which will be announced in the newsletter.

Note: Customers should be aware that future versions of BASIC will have different core locations assigned to its values, and thus user overlays probably will no longer function. It may be necessary for them to reassemble their overlays for the new releases of BASIC.

LAB8/e ADVANCED AVERAGER

Patch included in revision

The LAB8/e Advanced Averager program needs the following patches to prevent it from randomly crashing after the compiler phase Section I.

After Section I is loaded:

| <u>LOCATION</u> | <u>SHOULD BE</u> |
|-----------------|------------------|
| 162 | Ø |
| 175 | Ø |

This has been included in a new revision which is available from the Program Library.

Customers may order this software for the applicable fee:

| | | |
|-------------------|-----------------|--------|
| Paper Tape Binary | DEC-LB-U61B-PB | \$5.00 |
| Paper Tape Binary | DEC-LB-U63B-PB1 | \$5.00 |
| Paper Tape Binary | DEC-LB-U63B-PB2 | \$5.00 |
| Paper Tape Binary | DEC-LB-U63B-PB3 | \$5.00 |
| Paper Tape Binary | DEC-LB-U63B-PB4 | \$5.00 |

These prices apply to U.S. customers only. All others should consult their DEC field office for applicable charges and for placing their order.

SMALL COMPUTER HANDBOOK

Documentation Addition

The user should be aware that when using a PDP-8/e with KE-8E-EAE the mode-changing instruction SWAB causes a transfer of the AC to the MQ and clears the AC.

This is not documented in the Small Computer Handbook 1972.

LAP6-DIAL ASSEMBLER

Note on LINC mode assembling

At times, the LAP6-DIAL Assembler appears to incorrectly assemble LINC mode instructions. The following is an example of the most common:

```
0000          *20
0001          LMODE
0002          SEGMENT 3
0003          0000 1020  LDA I
0004          0001 6207  B
0005          0002 6206  STC C
0006
0007
0010
0011
0012          PMODE
0013          *6200
0014          6200 1606  TAD I C
0015          6201 4215  JMS PRINT
0016
0017
0020
0021
0022          6206 0000  C,  0
0023          6207 6400  B,  ZLIST
0024          6210 0000          0
0025          6211 0000          0
0026          6212 0000          0
0027
0030
0031          6215 0000  PRINT, 0
0032          *6400
0033          6400 0301  ZLIST, 301
0034          6401 0302          302
0035          6402 0303          303
0036          6403 0000          0
0037          6404 0000          0
0040          6405 0000          0
```

NO ERRORS

```
B      6207
C      6206
PRINT  6215
ZLIST  6400
```


In the previous example, notice that B and C have full 12 bit values associated with them (see the chart on page 3-3 of the LAP6-DIAL Manual, DEC-12-SE2D-D). Line 5 equals 6206 rather than 4206 because when STC, which equals 4000₈, is OR'ed with C, which equals 6206, the yield will be 6206 rather than the expected 4206.

The problem is caused by the user symbols defined in PMODE, and then referenced in LMODE, retaining their full 12 bit values. Instead of assembling as an STC into relative location 206 of the particular segment, the assembler yields a JMP to 206 of that segment. (The assembler cannot strip a symbol down to 10 bits because in line 4, 12 bits are really necessary.)

Depending upon the particular program, a good programming practice to follow is to add an &1777 or an !2000 to the instruction in order to turn on or off the necessary bits as shown in the following example:

```

0000                                *20
0001                                LMODE
0002                                SEGMENT 3
0003      0000    1020                LDA I
0004      0001    6207                B
0005      0002    4206                STC C&1777
0006
0007
0010
0011
0012                                PMODE
0013                                *6200
0014      6200    1606                TAD I C
0015      6201    4215                JMS PRINT
0016
0017
0020
0021
0022      6206    0000    C,          0
0023      6207    6400    B,          ZLIST
0024      6210    0000                0
0025      6211    0000                0
0026      6212    0000                0
0027
0030
0031      6215    0000    PRINT,      0
0032                                *6400
0033      6400    0301    ZLIST,      301
0034      6401    0302                302
0035      6402    0303                303
0036      6403    0000                0
0037      6404    0000                0
0040      6405    0000                0

```

NO ERRORS

page 2 of 2

```

B      6207
C      6206
PRINT  6215
ZLIST  6400

```

LAP6-DIAL 1

PDP-12 LAP6-DIAL BUILD

Disk initialization/Blocks 470 - 477 overlaid on disk

As currently implemented, LAP6-DIAL will copy blocks 300 to 477 from LINCtape to disk whenever the disk is initialized, i.e. LS=0701; RS=7310; I/O Preset; DO; Start 20. This will result in block 470 to 477, usually reserved for file area, to be overlaid by whatever is contained in blocks 470 to 477 on the LINCtape. To correct this problem, make the appropriate patch:

In the source (BUILD DEC-12-ZR5B)

| <u>LINE NUMBER</u> | <u>FROM</u> | <u>TO</u> |
|--------------------|-------------|-----------|
| 0674 | BM20, -20 | BM20, -17 |

On a LAP6-DIAL Systems tape

| <u>TAPE BLOCK</u> | <u>WORD</u> | <u>FROM</u> | <u>TO</u> |
|-------------------|-------------|-------------|-----------|
| 310 | 373 | 7760 | 7761 |

LAP6-DIAL-MS

Two bootstraps to load LAP6-DIAL-MS directly from the disk

The following two bootstraps should be used to load LAP6-DIAL-MS directly from the disk (RF08 or RK08). Each bootstrap, when assembled, will yield one block of binary that must be moved to block 0 of the respective disk via PDP-12 PIP. The following instructions should be followed to assemble the bootstrap needed:

1. Type up the program via LAP6-DIAL EDITOR
2. →ZE (zero binary work area)
3. →AS (assemble program)
4. →SB (save binary of program)
5. →DX (note where the one block of binary is saved)
6. →PIP*(load PIP and transfer the one block of binary to R10 (disk 0), block 0)
7. Toggle in the two or four word bootstrap and LAP6-DIAL-MS will start up.

* After the PIP transfer, the user should create an index entry (via PDP-12 TED) in the DIAL index so that DIAL will not save a file over this binary.

The procedure above assumes that the disk has been initialized. See LAP6-DIAL Manual, DEC-12-SE2D-D; Appendix A, section A.3.

*20

PMODE

*20

/RF08 BOOTSTRAP FOR DIAL-MS

/

/COPYRIGHT 1971

/DIGITAL EQUIPMENT CORPORATION

/MAYNARD, MASS, 01754

/

/7/14/71

/SGW

/

/FIRST, ASSEMBLE THE PROGRAM BELOW AND MOVE THE

/BINARY TO BLOCK 0 OF UNIT 10 (RF08 DISK),

/TO PRESERVE BLOCK ZERO, IT MAY BE WISE TO FAKE

/AN ENTRY IN THE INDEX OF UNIT 10 SHOWING

/BLOCK 0 AS USED, SO THAT SOMETHING DOESNT

/GET SAVED THERE AND DESTROY THE BOOTSTRAP,

/THEN,

/TO USE:

/TOGGLE IN THE FOLLOWING:

/ *20 /PMODE

/ 6603 /READ

/ 5021 /JMP ,

/

/ *7750

/ 7577 /WORD COUNT-1

/ 7777 /CORE LOC-1

/

/SET MODE = PMODE

/I/O PRESET

/START 20

/

/

| | | | | |
|------|------|---------|-------|----------------------------------|
| 0020 | 6623 | DISK | | /THIS OVERLAYS THE 6603 |
| 0021 | 5020 | JMP | .-1 | /AND THIS OVERLAYS THE JMP , |
| 0022 | 1044 | TAD | P6777 | |
| 0023 | 3445 | DCA I | P7750 | /LOAD WORD COUNT-1 |
| 0024 | 1044 | TAD | P6777 | |
| 0025 | 3446 | DCA I | P7751 | /AND ADDRESS-1 |
| 0026 | 1041 | TAD | P10 | |
| 0027 | 6615 | DIML | | /LOAD EXTENDED ADDRESS (FIELD 1) |
| 0030 | 1042 | TAD | P15 | /THIS IS BLOCK 322 IN DISGUISE |
| 0031 | 6643 | DXAL | | |
| 0032 | 1043 | TAD | P1000 | /...MORE OF BLOCK 322 |
| 0033 | 6603 | 6603 | | /READ |
| 0034 | 6623 | DISK | | /SKIP ON DONE |
| 0035 | 5034 | JMP | .-1 | |
| 0036 | 6213 | CIF CDF | 10 | |
| 0037 | 5440 | JMP I | .,+1 | |
| 0040 | 7777 | 7777 | | /BOOT DIAL NOW |
| 0041 | 0010 | P10, | 10 | |
| 0042 | 0015 | P15, | 15 | |
| 0043 | 1000 | P1000, | 1000 | |
| 0044 | 6777 | P6777, | 6777 | |
| 0045 | 7750 | P7750, | 7750 | |
| 0046 | 7751 | P7751, | 7751 | |

DXAL=6643

DIML=6615

DISK=6623

```

*20
/RK08 BOOTSTRAP FOR DIAL-MS
/
/COPYRIGHT 1971
/DIGITAL EQUIPMENT CORPORATION
/MAYNARD, MASS. 01754
/
/FIRST, ASSEMBLE THE PROGRAM BELOW AND MOVE
/THE BINARY TO BLOCK 0 OF UNIT 10 (RK08 DISK).
/IT MAY BE WISE TO FAKE AN ENTRY IN THE INDEX
/OFF UNIT 10 TO PROTECT BLOCK 0 SO THE BOOTSTRAP
/DOESNT GET DESTROYED.
/
/TO USE:
/TOGGLE IN THE FOLLOWING:
/
/      *20      /PMODE
/      6733     /READ
/      5021     /JMP .
/
/SET PMODE
/I/O PRESET
/START 20
/
/THE PROGRAM BELOW IS ORIGINATED AT *17, BUT IT ACTUALLY
/GETS LOADED AT *20, WHICH IS WHY ALL THE REFERENCES
/ARE OFF BY 1.
/

```

```

                PMODE
                *17
0017  6745      DSKD
0020  5020      JMP      ,-1+1      /SKIP DISK DONE (OVERLAYS THE 6733)
0021  1040      TAD      P10+1      /THIS IS REALLY JMP ,-1 (OVERLAYS THE JMP .
0022  6732      DLDC
0023  1041      TAD      P6777+1 /FIELD 1
0024  6755      DLCA      /STARTING ADDR, -1
0025  1042      TAD      P7000+1 /WORD COUNT
0026  6753      DLWC
0027  6742      DC LS
0030  1043      TAD      P322+1
0031  6733      DLDR
0032  6745      DSKD      /READ BLOCK 322
0033  5033      JMP      ,-1+1
0034  6213      CIF CDF 10
0035  5437      JMP I   .+1+1      /BOOT DIAL NOW
0036  7777
0037  0010      P10,      10
0040  6777      P6777,   6777
0041  7000      P7000,   7000
0042  0322      P322,    322
                DSKD =6745
                DLDC =6732
                DLCA =6755
                DLWC =6753
                DC LS =6742
                DLDR =6733

```

PDP-12 DIAL-MS

Patch to force Linctape to be the system device

There are a number of occasions when it is desirable that DIAL-MS not use a disk as the system device, even though one is present on the system. Among these instances are the following cases:

1. Using the FPP Assembler on a system with one DF-32 disk: the Assembler requires DIAL-MA, but also requires that if DF-32's are used as the system device, at least two must be present.
2. Using Focal-12 under these same circumstances.
3. Initializing a tape on a system with an inoperable or malfunctioning disk.
4. Starting up DIAL-MS on a system in which the disk must not be overwritten, e.g., in a CL-12 or PS/12 situtaion.

The following patch to the DIAL-MS system tape solves this problem by allowing sense switch 0 to affect the choice of a system device. If SS 0 is in the 0 position, DIAL-MS is initialized in the same manner as it currently is. If SS 0 is in the 1 position at the time of initialization, however, Linctape will be chosen as the system device regardless of what disks are present on the system.

| <u>BLOCK</u> | <u>REL. LOCN.</u> | <u>OLD VALUE</u> | <u>NEW VALUE</u> |
|--------------|-------------------|------------------|------------------|
| 310 | 014 | 0 | 0440 |
| 310 | 015 | 0 | 6036 |
| 310 | 016 | 0 | 0002 |
| 310 | 017 | 0 | 5766 |
| 310 | 035 | 0011 | 6014 |

PDP-12 EDITOR

Attention PDP-12B $\frac{1}{2}$ (A-D's, but no relays) users.

The LAP6-DIAL V2 EDITOR checks to make sure the relays are available, to tell whether to use the analog potentiometers in the Editor. To get around this, the following patch should be used:

1. Load block 312 into core via $\emptyset 7\emptyset\emptyset \emptyset 312$; I/O preset: D0
2. Change linc location $4\emptyset 46$ from $765\emptyset$ to $72\emptyset\emptyset$
3. Rewrite back onto tape block 312 via $\emptyset 7\emptyset 4$

PDP-12 LAP6-DIAL PIP

Patch to allow PIP to save programs on a 1600₈ block LINCTape

To allow PIP (on LINCTape DEC-12-SE2E-UO) to save files on a 1600₈ block LINCTape, make the following changes to the binary:

1st block of the actual binary (starting block in index + 1)

| <u>WORD</u> | <u>FROM</u> | <u>TO</u> |
|-------------|-------------|-----------|
| 113 | Ø777 | 1577 |

7th block of the actual binary (starting block in index + 7)

| <u>WORD</u> | <u>FROM</u> | <u>TO</u> |
|-------------|-------------|-----------|
| 356 | Ø777 | 1577 |

Note: With this change the "U" option in auxilliary mode will still copy only the first 1ØØØ₈ blocks.

The following patch may be used on the PIP source (on LINCTape DEC-12-SEZB-UO, part 1)

PIP Source

| <u>LINE NUMBER</u> | <u>FROM</u> | <u>TO</u> |
|--------------------|-------------|-------------|
| 0237 | TUPPER=777 | TUPPER=1577 |

Note: With this source change, once PIP is reassembled and saved, the "U" option will copy a full 1600₈ blocks.

NOTE! Please notice the above change from header block to starting block number, when you display the index of a LAP6-DIAL tape.

PDP-12 LAP6-DIAL PIP

Patch to allow PIP's "D" option to copy a 1600₈ block LINCtape

To allow PIP (on LINCtape DEC-12-SE2E-UO) to copy a 1600₈ block tape using the "D" option make the following changes to the binary:

14₈th block of the actual binary (starting block in index +14₈)

| <u>WORD</u> | <u>FROM</u> | <u>TO</u> |
|-------------|-------------|-----------|
| 221 | 7332 | 1113 |
| 222 | 7Ø1Ø | 7ØØ1 |

The following patch may be used on the PIP(4) source (on LINCtape DEC-12-SEZB-UO, part 1).

| <u>LINE NUMBER</u> | <u>FROM</u> | <u>TO</u> |
|--------------------|-----------------|------------|
| 1264 | CLA CLL CML RTR | TAD EUPPER |
| 1265 | RAR | IAC |

NOTE: This patch assumes the LAP6-DIAL PIP 1 patch has also been implemented.

LINKING LOADER (PAPER TAPE VERSION)-DEC-08-A2C3-PB

Failure to initialize low-speed reader on PDP-8/E

The current version of the paper tape LINKING LOADER does not issue a KCC instruction to initialize the low-speed reader. This fact does not effect users with a PDP-8, 8I, or 8L, as the START key sets reader run. However, this is not true on the 8E, and users trying to load via the low-speed reader will not be able to do so. The following patch to the LOADER will correct this problem. It should be made after loading the LOADER.

| <u>LOC</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|------------|---------------------|---------------------|
| 6200 | (7200) | 6032 |

SOURCE PATCH - CHANGE THE 'CLA' AT 6200 to A 'KCC'.

KE8E EAE INSTRUCTION TEST 1, MAINDEC-8E-DOLA

Patch

The problem is the Maindec does not check that normalize in "B" mode will clear the AC, if AC=4000 and MQ=0000 prior to issuing a normalize.

The way to correct the problem is to toggle the following changes into memory after loading the program:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO:</u> | |
|-----------------|-------------|------------|--------------------------------|
| 4741 | 7447 | 5360 | /GO to Patch |
| 4760 | | 7431 | /"B" Mode |
| 4761 | | 7621 | /AC and MQ=0 |
| 1762 | | 7330 | /AC=4000;MQ=0000 |
| 4763 | | 7411 | / Normalize |
| 4764 | | 7440 | / AC should be 0 |
| 4765 | | 7402 | / Normalize failed to clear AC |
| 4766 | | 7447 | /"A" Mode |
| 4767 | | 5342 | / Exit |

KE-8E (EAE) INSTRUCTION TEST 1 MAINDEC-8E-DOLA
PATCH

The problem is the "TO BE ADDED" printout that occurs on a "DAD" failure, always indicates zero is being added to the AC and MQ.

The way to correct the problem is to toggle the following changes into memory after loading the program:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 7236 | 1023 | 1037 |
| 7241 | 1024 | 1040 |

PDP-8E-TELETYPE AND KL8 ASYNCHRONOUS DATA CONTROL TESTS

MAINDEC-8E-D2AB, Patch

The problem is this program cannot test a KL8 jumpered for 2400 Baud transmit and receive.

The patch which can correct this problem is as follows:

1. Toggle into memory the following changes after loading the program:

| LOCATION: | FROM: | TO: |
|-----------|-------|------|
| 0141 | 7754 | 7767 |
| 0204 | 4776 | 5776 |
| 0504 | N/A | 4777 |
| 0505 | N/A | 7630 |
| 0506 | N/A | 7500 |
| 0507 | N/A | 7200 |
| 0510 | N/A | 6600 |
| 0511 | N/A | 5400 |
| 0512 | N/A | 7670 |
| 1574 | 7773 | 7772 |
| 2626 | 7636 | 7637 |

2. Remove G field jumpers and connect G9 and G10 if they exist.
3. If G9 and G10 do not exist, connect E 5 pin 11 to split lug G1 by means of a clip lead and IC clip.
4. Deposit 2400 in location 22. (program can still operate at previous baud rates.)
5. Run program's 0 and 1. Test board at 150/150 2400/2400.

MI8-E BOOTSTRAP DIAGNOSTIC

MAINDEC-8E-DLIA, Patch

This program does not check the possibility that the MI8-E option under test could have affected the memory locations between the bootstrap block of data information and the diagnostic. Insert the following patch to correct the problem.

| LOW VERSION | | HIGH VERSION | |
|-----------------|-----------------|-----------------|-----------------|
| <u>LOCATION</u> | <u>CONTENTS</u> | <u>LOCATION</u> | <u>CONTENTS</u> |
| 740 | 5370 | 4740 | 5370 |
| 770 | 4341 | 4770 | 4341 |
| 771 | 5215 | 4771 | 5215 |

MR8-EA Read Only Memory Test

MAINDEC-8E-D1JA

The following patch corrects the problem of data being taken from the wrong address to produce incorrect data in the error typeout.

For the low version (MAINDEC-8E-D1JA-PB1) change the contents of address 1633 to 1775 (TAD ACHECK).

For the high version (MAINDEC-8E-D1JA-PB2) change the contents of address 6433 to 1773 (TAD ACHECK).

DF32 DISCLESS Logic Test, MINIDISC (MAINDEC-08-D5BB)

Patch and revision

Because of the speed at which a PDP-8E or a PDP-12 with ECO EP-00021 and above handles data breaks, the "DATA REQUEST LATE" test in this program always fails. This does not mean that there is a hardware problem, only that it cannot be tested.

The following temporary patch causes the DRL test to be by-passed.

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 2620 | 7410 (SKP) | 7000 (NOP) |

This problem has been corrected in a revision of this diagnostic program. Customers may order the following items for the applicable fee.

| | | |
|-------------------|--------------------|--------|
| Binary Paper Tape | MAINDEC-08-D5BC-PB | \$5.00 |
| Document | MAINDEC-08-D5BC-D | \$5.00 |

All prices are in U.S. dollars and apply to U.S. customers only. Because currency and import considerations affect the prices in all countries outside the U.S., all other users must check with the nearest Digital office or representative to place their orders.

U.S. customers may send orders with purchase order, check or money order directly to

Software Distribution Center
Digital Equipment Corporation
146 Main Street
Maynard, Massachusetts 01754

AD8E, AM8E A-D CONVERTER & MULTIPLEXER DIAGNOSTIC
(MAINDEC-8E-D6BB)

Problems with incorrect tag and switch setting

Two problems have been reported in this diagnostic.

There is an incorrect tag which can be rectified by the following patch.

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 2704 | 5245 | 5247 |

Another problem is that the program fails when SWØ is not set to a one (printout inhibit) when running the Resolution Accuracy Test.

FLOATING POINT INSTRUCTION TEST 2C (MAINDEC-12-DØOB)

Patch to correct time out loop

The following minor correction is needed for a time out loop.

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 4071 | 1367 | 4505 |
| 4072 | 3107 | 1367 |
| 4073 | 4505 | 3107 |

PDP-8/E TELETYPE AND KL8 ASYNCHRONOUS
DATA CONTROL TESTS (MAINDEC-8E-D2AC)

Patch to correct erroneous characters

If SR2 is set in program 4 to loop the test, erroneous characters are printed out.

To correct this problem, toggle the following change into memory after loading the program.

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 0245 | 7500 (SMA) | 7700 (SMA CLA) |

RF08 DISK DATA (MAINDEC-08-D5EB)

Patch to check IOT operation

This program fails to verify that IOT 6603 (DMAR) clears the AC.
To correct this problem, make the following changes.

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 3174 | 7440 | SZA |
| 3175 | 7402 | HLT/ERROR |
| 3176 | 7200 | CLA |
| 3177 | 5756 | JMP I READ |

PDP-8 MATH ROUTINES (DEC-08-FMCB)

Error in the dividend check routine in the Single Precision Divide Subroutine

A difficulty has been noted in the Single Precision Signed Divide Subroutine (DEC-08-FMCB) of the Math Routine Package. If the high order dividend specified is zero, the low order dividend is treated as a signed number in the check for the fractional quotient. If that part of the dividend is between 4000_8 and 7777_8 , it is considered negative and a fractional quotient error results. To correct this problem, the source tape as supplied by the Program Library should be edited as follows and reassembled (changes are underlined):

| <u>OLD CODE</u> | <u>NEW CODE</u> |
|-----------------|-------------------|
| JMP CONT | JMP CONT |
| TAD DIVSOR | <u>CLL</u> |
| TAD LDIVND | <u>TAD</u> DIVSOR |
| SPA CLA | TAD LDIVND |
| JMP DFRAC | <u>SNL</u> CLA |
| CONT,CLL | <u>JMP</u> DFRAC |
| | CONT,CLL |

PDP-12 MILDRED (DEC-12-FZDA)

Patch to allow reference of units 0 - 77

The current version of MILDRED will only reference units 0 - 17. To allow referencing of units 0 - 77, change the following location:

IN THE SOURCE:

| <u>LINE NUMBER</u> | <u>FROM</u> | <u>TO</u> |
|--------------------|-------------|-----------|
| 0207 | 7760 | 7700 |

IN THE BINARY:

Change the following word in the second block of the binary (second block = starting block + 1)

| <u>WORD</u> | <u>FROM</u> | <u>TO</u> |
|-------------|-------------|-----------|
| 124 | 7760 | 7700 |

PDP-12 MILDRED (DEC-12-FZAD)

Reassembling MILDRED in odd numbered segments

As currently implemented, MILDRED cannot be reassembled in an odd numbered segment (ie segment 1, 5 or 7). To correct this problem, change the following locations:

In the Source:

| <u>LINE NUMBER</u> | <u>FROM</u> | <u>TO</u> |
|--------------------|-------------|---------------|
| Ø177 | PPNT1 | PPNT1&777 |
| Ø2ØØ | STC PPNT2 | STC PPNT2&777 |

If you are reassembling MILDRED, remember to add in a Segment X (X=Ø to 7) pseudo-op, followed by a *2Ø in the beginning of the source.

PDP-12 MILDRED

Patch to allow MILDRED to address a 1600g block LINCtape

To allow MILDRED to create index entries on a 1600g block LINCtape, make the following changes to the source and re-assemble to generate a new binary.

MILDRED (source) DEC-12-FZDA

| <u>LINE NUMBER</u> | <u>FROM</u> | <u>TO</u> |
|--------------------|-------------|-----------|
| 0545 | -1000 | -1577 |
| 1033 | 7000 | 6000 |

OS/8 PIP WITH TD8E

Patch to correct loss of data files

Trying to compress a device onto DTAl produces a shortened directory on DTAl. In particular, compressing DTAl onto itself can cause loss of data files. This error only exists on TD8E systems, and only when the tape on DTAl is a non-system tape.

The correction is:

```
. GET SYS PIP  
  
. ODT  
  
15276/7620 7640  
  
51352/0177 0171  
  
7600G  
  
. SAVE SYS PIP
```

PAL-D ASSEMBLER (DEC-D8-ASAC-PB)

Patches to Correct:

- 1) Use of PAGE pseudo-op
- 2) Appearance of an extraneous character in the listing when multiple inputs from the disk are used.

The PAGE pseudo-op in PAL-D does not perform correctly when used as follows:

PAGE SYMB

where SYMB is a previously defined symbol. The current location counter is set to the middle of a core page. The following patch will correct this problem:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 0620 | 0145 | 1112 |
| 0621 | 1112 | 0145 |

If the user desires successive PAGE pseudo-ops with no arguments or a PAGE with no argument at the beginning of a page to be ignored, the following patch should be made:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 0620 | 0145 | 1144 |
| 0621 | 1112 | 0145 |

This patch also handles the previous problem with PAGE SYMB.

If the user is assembling two disk files with PAL-D and the first file does not end with a PAUSE pseudo-op (it doesn't have to), an extraneous character will be inserted in the assembly listing between the two files. This character does not in any way effect the binary output of the assembly. The following patch will eliminate the character:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 4072 | 1747 | 1750 |
| 4322 | 1747 | 1750 |

PAL-8

Programming Note on use of conditionals

It is possible to construct useful pseudo-ops such as IFNEG and IFPOS as in the following example:

IFNEG expression <statements> (assemble statements
if expression is
negative)

can be written as:

IFNZRO expressions &40000 <statements>

while its complement.

IFPOS expression statements, can be implemented
by writing:

IFZERO expression &40000 <statements>

To prevent PAL-8 from printing nonsatisfied conditional assembly statements in the listing, the following solution, employing complementary conditionals, is suggested:

```
IFNDEF  LTAPE <XLIST >
IFDEF   LTAPE <
    HERE
    GOES
    THE
    CODE
IFNDEF  LTAPE <XLIST >
```

Additional information on copy functions of PIP

The Peripheral Interchange Program of the Disk/DECTape Monitor System (PIP) will transfer files between any of the various devices recognized by the system (i.e. Disk, DECTape, High Speed Paper Tape Reader, High Speed Paper Tape Punch, Teletype Reader, Teletype Punch).

All of the transfer or copy functions use the same conventions to specify the destination (output) and the origin (input) of the file to be copied, and to start the actual transfer once the necessary information has been given. These conventions are essentially:

- 1) Use the device name followed by the file named to reference any file which exists (input) or is to exist (output) on a file structured mass storage device. For the system device (Disk if present or DECTape) this name is S:
For any non-system DECTape this name is D1:, D2:, D3: etc. depending upon the physical unit setting of the hardware. The file name consists of up to four ASCII characters.
- 2) Use only the device name to reference any file which exists or is to exist on a non-file-structured device. For both the high speed paper tape reader and punch this name is R:
For both the teletype reader and punch this name is T:
- 3) To indicate more than one file (legal only as input to A option; used for merging ASCII files), reference the files by the above rules and use commas as separators.

ex S:FILE, S:FILB, D4:FILN
 R:, R:, T:, R:

- 4) Type CTRL/P (\uparrow P) to start the actual transfer of each file. This is done by depressing the CTRL key while striking the P. PIP will type \uparrow 's to remind you to type CTRL/P to start transfers if the copy operation is between disk and DECTape, disk and high speed paper tape, DECTape and high speed paper tape, or if it uses the teletype for input but not for output.

If, however, output is to the teletype punch, it is imperative that the user remember the convention and type CTRL/P to start the transfers. PIP cannot type an ↑ as a reminder because it would be punched on the output tape as well as typed. (CTRL/P is not echoed so it won't be punched.)

EXAMPLE:

```
*OPT-A
*OUT-T:↓
*IN-S:FILE↓
```

A pause occurs here as PIP is waiting for the user to type CTRL/P

```
*OPT-A
*OUT-R:↓
*
*IN-S:FILE↓
*↑
```

A pause occurs here after PIP has reminded the user it is waiting for CTRL/P.

The purpose of the pause is to allow the user time to turn on the punch he wants to use, or to take a DEctape off write lock, or to place a tape in the reader. The copy routine will not proceed until a CTRL/P has been typed.

PDP-8 DF32/RF08 PIP (DEC-D8-PDAD and DEC-D8-PDZE)

Information on performance of latest versions of PIP.

PIP can only copy relocatable binary tapes (output of the SABR Assembler) from reader to punch. PIP cannot copy relocatable binaries to or from a mass-storage device (disk or DECTape).

PIP will only copy the first section of a multi-section binary tape when output is to the disk or DECTape, even though the entire tape will go through the reader. A multi-section binary tape is one that has leader/trailer (code 200) imbedded. The binary copy of such a tape to the mass-storage device will cease once the leader/trailer is encountered, even though PIP will not stop reading the tape until it has received a physical end of tape signal from the reader.

PIP may insert an extraneous character when merging a paper tape with a disk or DECTape file, when the output is going to disk or DECTape. This can happen when the end of the paper tape is jagged and it is interpreted as punches in the tape. It can also be caused by the fact that PIP treats input, character by character when it is from a non file-structured device (teletype or high speed reader) and word by word when it is from a file-structured device (disk or DECTape). Thus, if there is an odd number of characters from the non file-structured device, one half of a word in the output file will be filled with either an @ character or a control character. This can be avoided by first transferring the paper tape to the system device before merging the files.

PDP-8 PIP (DEC-D8-PDAD and DEC-D8-PDZE)

Program halt due to unexpected interrupt

The above noted library versions of PIP will halt at location 0266 with PC=0227, MA=0226, MB=7412 and the AC=0000 upon receipt of an unexpected interrupt. An example of this may be an interrupt from a device other than Disk, DECTape, High Speed Reader or Punch, or Keyboard Reader or Punch. Users should be able to eliminate the problem by starting the Monitor at 7600 and calling PIP again (start key will clear the flags).

PS/8 MULTI-BLOCK DIRECTORIES

COMPRESSION OF FRAGMENTED DIRECTORY SEGMENTS

When a directory extends beyond the first block, the following situations can occur:

1. If the last entry in a block is an "empty" and you delete the first file in the succeeding block, two consecutive empties will appear in the directory listing.
2. If you delete a file from a directory block, (other than the last block in use) an empty file equal to the length of the file deleted will be created. However, the only way another file may be added to that block is by transferring a file of known length that can be accommodated in an existing empty file. Temporary (newly created files) files are always added at the end of the directory unless you specify a maximum length with the square bracket option. Therefore, "full" directory blocks may have far less than the minimum number of file entries.
3. When you move a file of known or maximum specified length, it will replace the first empty file with a length closest to the desired length. This feature works across blocks beginning with the first block.

Item 3 is an explanation of why files go where they go. Fragmented directory segments are compressed using the IS option in PIP.

This removes all empties by rewriting the files and the directories. This file will have a maximum number of file entries in each directory block up to the last block in use.

8K SABR ASSEMBLER (DEC-08-A2D2-PB)

Problem in Listing PASS with OFF-PAGE Externals

There is a problem in the library version of the SABR assembler (version 16), which can cause SABR not to list a linkage to an off-page external symbol. The binary output of pass 1 contains the correct link-word, but the word is not listed in the pass 2 output. The following patch will correct this problem:

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> |
|-----------------|---------------------|---------------------|
| 3735 | (ØØ16) | Ø377 |
| 3777 | (unused) | Ø4Ø3 |

8K SABR ASSEMBLER (DEC-08-A2D2 - 16)

TEXT pseudo-op problem

The current version of the 8K SABR Assembler loses track of an internal pointer when it is not in automatic paging mode and it encounters a 'TEXT' pseudo-op that stretches across a page boundary.

The following patch will correct this problem:

| <u>LOCATION</u> | <u>FROM</u> | <u>TO</u> |
|-----------------|-------------|-----------|
| 1671 | 3151 | 3377 |
| 1702 | 2151 | 2377 |
| 1710 | 1151 | 1377 |
| 1720 | 1151 | 1377 |
| 1722 | 3151 | 3377 |
| 1743 | 2151 | 2377 |

PS/8 ON TD8E

Patch to correct file operations

In the preliminary release of PS/8 on the TD8E the user is not able to successfully zero the directory or perform a file compression on devices SYS or DSK. When these operations are tried, the number of free blocks remaining on the tape is in error. The problem is that PIP's device length table was not updated to reflect the TD8E device type. The new release of OS/8 does not contain that problem.

To correct the situation, use ODT with PIP as follows:

```
⌘ GET  SYS  PIP
⌘ ODT
13621 / 00000 6437
7600G
⌘ SAVE  SYS  PIP
```

This gives SYS and DSK on the TD8E the correct device size.

TSS/8 BASIC V4

Changing the number of columns in the LPRINT command

- 1) The following patch to BASIC V4 will enable the LPRINT command to handle any number of line printer columns. The maximum number of characters that will appear on a single line is specified at location 1375 in the patch. Any attempt to write more characters than this on a single line will result in wraparound to the next line.

The patch is:

.LOAD BASIC 14157 400 6226

| At Location | Deposit | Comment |
|-------------|---------|---|
| 1104 | 4771 | |
| 1114 | 1361 | |
| 1361 | 1517 | |
| 1362 | 2205 | |
| 1363 | 7740 | |
| 1364 | 0000 | |
| 1365 | 1774 | |
| 1366 | 3014 | |
| 1367 | 1375 | |
| 1370 | 3774 | |
| 1371 | 1014 | |
| 1372 | 3375 | |
| 1373 | 5516 | |
| 1374 | 2510 | |
| 1375 | nnnn | -number of line printer columns (7660 for 80, 7574 for 132) |
| 4233 | 5777 | |
| 4377 | 1365 | |
| 4771 | 1411 | |
| 4772 | 1605 | |
| 4773 | 4024 | |
| 4774 | 1717 | |
| 4775 | 4014 | |
| 4776 | 1716 | |
| 4777 | 0700 | |

THEN:

.SAVE BASIC 14157 400 6226

TSS-8

Disk/Core Redefinitions

Changes in the number of disks or number of core fields on a Time-Shared 8 system do not require reassembly of the entire Monitor. Following is the information necessary to make the appropriate changes.

Users who are not familiar with the DISKLOOK section of INIT that starts at location 0200 should read Chapter 4 of the Time-Sharing System Manager's Guide. The locations that are listed here refer to Version 22B of the Time-Shared 8 Monitor. Locations in earlier versions may differ slightly from these.

To change the number of disks, either RF/RS08 or DF32:

loc. 23527 becomes -DSKSIZ
loc. 23742 becomes DSKSIZ
where DSKSIZ = (# of disks)x100(octal)

Having made these two changes it is necessary to "REFRESH the disk" using INIT. This, of course, requires reloading all of the files.

Although it is not really necessary to change the Monitor when adding more core, for consistency here are the changes that can be made. Additional core fields can be utilized by correctly answering the INIT question:

OF USER FIELDS?

This number is two less than the total number of fields in the system (8K resident Monitor).

To correct the Monitor for added core fields:

loc. 25400 becomes CORMEM
If 680-type teletype interfacing,
loc. 33437 becomes CIF CDF + CORMEM
loc. 33444 becomes COREXT
If not 680 interfacing,
loc. 33430 becomes CIF CDF + CORMEM
loc. 33435 becomes COREXT
Where CORMEM = (highest field #)x10(octal)
and COREXT = CORMEM if RF/RS08
= 200 + CORMEM if DF32

TSS/8 V22B

Patch to correct LPT/DTA interference

The patch below removes the DTSF from the LPT/PTP driver whenever the DTSF is removed from the interrupt chain and inserts it whenever the DTSF is inserted in the chain. This prevents the LPT driver from dispatching to the DTA routine when the DTA has been disabled by a select error or other causes.

Unit 0 should be selected when the system is started unless the ECO for DTCA has been installed.

The following patch should be made to TS8II.

| <u>LOCATION</u> | <u>OLD CONTENTS</u> | <u>NEW CONTENTS</u> | <u>SOURCE</u> |
|-----------------|---------------------|---------------------|---------------|
| 1250 | 3437 | 4776 | JMS I PATCHM |
| 1376 | 0000 | 2156 | PATCHM, PATCH |
| 1651 | 3437 | 4775 | JMS I PATCHL |
| 1712 | 3437 | 4775 | JMS I PATCHL |
| 1775 | 0000 | 2156 | PATCHL, PATCH |
| 2156 | 0000 | 0000 | PATCH, 0 |
| | 0000 | 3365 | DCA SAVE |
| | 0000 | 1365 | TAD SAVE |
| | 0000 | 3437 | DCA I Z 37 |
| | 0000 | 1365 | TAD SAVE |
| | 0000 | 3766 | DCA I LPTDTI |
| | 0000 | 5756 | JMP I PATCH |
| | 0000 | 0 | SAVE, 0 |
| | 0000 | 7535 | LPTDTI, 7535 |

PDP-12 LAP6-DIAL-MS User's Manual

Correction for Add Binary command

There is an error in the LAP6-DIAL-MS User's Manual as to the actual relocation factor for the binary. The formula on page 4-6 should read:

$$[(\text{FIELD} * 10000 + \text{ADDRESS}) - (\text{ORG} \& 17400)]$$

The following are a few examples of how this command works:

| <u>Lowest orgin in program</u> | <u>Specified Address</u> | <u>Relocated To</u> |
|------------------------------------|------------------------------|-------------------------|
| * 250 | 500 | 750 |
| * 500 | 500 | 600 |
| * 1200 | 4000 | 4200 |
| * 6300 | 4000 | 4300 |

PDP-12 AIPOS USER'S MANUAL (DEC-12-SQ1A)

Documentation correction

Page 4-1, Section 4.3 of the AIPOS User's Manual (DEC-12-SQ1A-D) states that the L R command to FOCAL-12 will cause a return to JDB Control. This is an error. The R must be followed by a comma (,). Therefore, the format should be:

L R, ↓

PDP-12 MASH USER'S MANUAL

Additional notes on Automatic Mode

The following information on the automatic mode should be inserted in the MASH User's Manual (DEC-12-SQ2A-D), as the third paragraph on page 16.

If G is typed again, automatic mode initiates a series of scans that last until the chromatograph run is complete. Pressing one of the right switches on the console terminates scanning and returns the program to the TIC vs. Time plot.

PDP-12 LAP6-DIAL EDITOR

Note on correct usage of the LAP6-DIAL EDITOR

While working with LAP6-DIAL Editor, the user may experience problems if he encounters the following situation:

| | | |
|--------------|--|--------------|
| 4036 4037 | /THIS IS THE 100th BLOCK /THIS IS THE LAST LINE | BLOCK 100 |
| 4040 | /THIS IS THE FIRST LINE IN BLOCK 101 | BLOCK 101 |

Assume there are four spaces after the 1 in 101. By moving the cursor back using knob 3 to anywhere on the line and pressing a return, line 4040 up to the cursor will be stored (written) onto block 470.

The same procedure will work if you are at line 7777, except the next thing viewed on the scope is line 1 and the entire working area is destroyed.

Basically, the above example states the following:

DO NOT turn the cursor back and strike a carriage return in the middle of a line whenever you feel you have a 100 block source program in the working area (or you are at line 7777).

This problem has been corrected in the LAP6-DIAL-MS Version 2. However, it will not be corrected in the LAP6-DIAL-V2 System Editor that goes out on that same tape (DEC-12-SE2A-UO).

PDP-8 Hardware design note for the DF32 disk

Programming note concerning the DEAL instruction

It is now possible for bit 0 of the AC to be set by the photocell sync mark when using DF32 Disk instruction, DEAL (6615). If the user expects the AC to be unchanged, this could effect his program.

Therefore, the user should not write his program such that it depends on the contents of the AC remaining unchanged after a DEAL instruction. Page 2-4 of the DF32 Disk File and Control Instruction Manual specifies only the contents of AC bits 1-8 and claims only these bits will remain unchanged. If the information in the AC is to be used after a DEAL, bits 0 and 9-11 should first be masked out.

PDP-12 PROGRAMMING NOTE

Software Solution to a DJR Problem

A problem occurs when returning to a main program after executing a subroutine in another instruction field. The problem occurs when the DJR is used in the subroutine to save the contents of location \emptyset of the subroutine's instruction field.

The following text describes the problem and gives two ways of programming around it.

In PDP-12 (L Mode) programming the JMP \emptyset (zero) instruction, when used in a subroutine, returns the program counter to the calling program because location \emptyset of the current instruction field (IF) will contain the return jump instruction. If the subroutine is in a different IF than the calling program then the instruction sequence LIF (), JMP (subroutine) causes the return jump instruction to be placed in location \emptyset of the instruction field containing the subroutine. Program control returns to the calling program in a direct, convenient way by the LIF () and JMP \emptyset instructions at the end of the subroutine. Normally, a JMP \emptyset instruction that follows the LIF () instruction places the program counter at location \emptyset of the current (subroutine) IF instead of in the new (calling program) IF.

If the subroutine contains JMP commands then the contents of location \emptyset are preserved by using the DJR instruction before each JMP instruction. However, if, by the circumstances of the subroutine, a DJR is not cleared (i.e. by a JMP ($\neq\emptyset$)) before the LIF () JMP \emptyset sequence, then the program counter goes to location \emptyset in the IF of the calling program instead of the IF of the subroutine. That is, the DJR instruction not only inhibits the changing of location \emptyset of the same IF but it also causes the program counter to go to location \emptyset of the new IF when the JMP \emptyset is executed. Although this return to location \emptyset in the calling program's IF could be utilized, it is not consistent with the procedure of saving the return jump in location \emptyset of the subroutine's IF and then protecting that return jump with the DJR.

Two procedures are presented to circumvent the problem of returning to the wrong IF. Note in procedure 1 that extra instructions, DJR and JMP $+.1$, must be inserted in the subroutine, and in procedure 2 the instructions JMP $+.3$, LIF 1 and JMP BSUB must be added to the calling program so that the program counter will return to the proper instruction after the subroutine is executed.

Software Solution to a DJR Problem (Continued)

Procedure 1

| Storage Location | Calling Program (IF 2) |
|------------------|---|
| 4000 | 0000 Contents are not changed by JMP SUB |
| . | . |
| . | . |
| 4060 | LIF 1 |
| 4061 | JMP SUB |
| 4062 | ADA (Program control returns here after executing the subroutine) |
| 4063 | . |
| . | . |
| . | . |
| . | . |

| Storage Location | Subroutine (IF 1) |
|------------------|--|
| 2000 | JMP 0062 (Return JMP placed here after execution of 4061) |
| . | . |
| . | . |
| . | . |
| 2120 | SUB, STA i |
| 2121 | 0 |
| . | . |
| . | . |
| 2140 | DJR |
| . | . |
| . | . |
| 2150 | APO |
| 2151 | JMP .+4 |
| . | . |
| . | . |
| . | . |
| 2167 | DJR (If previous JMP is not executed then this DJR |
| 2170 | JMP .+1 and JMP clears the DJR |
| 2171 | LIF 2 and saves the contents |
| 2172 | JMP Ø of 2000) (Program counter goes to 2000, then the IF is changed to 2 and the program counter goes to location 4062) |

Software Solution to a DJR Problem (Continued)

Procedure 2

| Storage Location | Calling Program (IF 2) |
|------------------|------------------------------|
| 4000 | JMP 062 (Return jump after |
| . | executing JMP ASUB) |
| . | . |
| . | . |
| 4060 | . |
| 4061 | JMP ASUB |
| 4062 | ADA (Program control returns |
| . | here after executing the |
| . | subroutine and the jump |
| . | at location 4000) |
| . | . |
| . | . |
| 4111 | JMP .+3 |
| 4112 | ASUB, LIF 1 |
| 4113 | JMP BSUB |
| 4114 | . |
| . | . |
| . | . |
| . | . |

| Storage Location | Subroutine (IF 1) |
|------------------|--------------------------------------|
| 2000 | JMP 114 (Return jump after executing |
| . | JMP BSUB) |
| . | . |
| . | . |
| 2120 | BSUB, STA i |
| 2121 | 0 |
| . | . |
| . | . |
| . | . |
| 2140 | . |
| . | (DJR is not required. The |
| . | contents of location 2000 |
| . | are not used to return to |
| . | the calling program) |
| . | . |

Software Solution to a DJR Problem (Continued)

| | | |
|------|---------|--|
| 2150 | APO | |
| 2151 | JMP .+4 | |
| . | . | |
| . | . | |
| . | . | |
| 2170 | DJR | (This DJR will cause the program counter to go to 4000 at the execution of the JMPØ instruction at 2172) |
| 2171 | LIF2 | |
| 2172 | JMPØ | |

TC-58 Hardware Information

The following items may be informative to users with TC-58's as they are not included in the documentation.

- a. To change the data field, execute MTGO with the field in bits 6-8 of the accumulator. The accumulator is not cleared.

For example:

```
TAD FIELD
MTGO
CLA
```

- b. A bad tape is detected in all modes except Rewind, Write end of file (EOF), or Write.
- c. When Write EOF is completed, the EOF bit is set. Prior to this, EOF marks are not detected.

RTPS FORTRAN IV (FORRTS.FT version 4)

Patch to correct logical input field

It is possible for a logical input field to be incorrectly filled if T or F is not the first character read. Use FPIP to effect the following one location patch to correct this problem.

| | |
|-------------------|---|
| .R EPIC | Call EPIC |
| * FORRTS.FT </1\$ | Load FORRTS for editing (\$ is altmode) |
| R,24 | Read block 24 |
| O,335 | Open location 335 |
| <u>5316/5317</u> | Change 5316 to 5317 |
| W | Write the block |
| E | Exit |
| * ↑ c | Return to OS/8 |

Problem with arithmetic functions

When using arithmetic functions, a problem with temporary storage occurs if an arithmetic operation of more than 1 step is performed before using the arithmetic function on a calculation. For example,

```
ROUT(A) = A*2+SQRT(A)
```

```
V = (3.+C) /ROUT (C)
```

The result of the calculation of 3.+C is destroyed during the calculation of ROUT(C), so the value of V is incorrect.

This problem can be avoided by using an external function instead of an arithmetic function. (Another means would be to use only 1 step arithmetic calculations after the arithmetic function description, but this path is not recommended.) The above calculation will execute successfully if ROUT is described in an external function as:

```
FUNCTION ROUT(A)
```

```
ROUT = A*2+SQRT(A)
```

```
END
```

RTPS FORTRAN IV (F4.SV version 1.06)

Problem with DO loops in I/O statements

An error occurs if a subscripted variable is the upper limit in a DO loop in an I/O statement. For example:

```
WRITE (4,100) (PAR(I),I=1,4), (DATA(I),I= 1, PAR(1))
```

This problem will be corrected in the next release of FORTRAN. For the current version it is possible to code the program so a subscripted variable is not the upper limit in an I/O statement. For example, J=PAR(1)

```
WRITE(4,100) (PAR(I), I=1,4) (DATA(I),I=1,J)
```

RTPS FORTRAN IV (DEC-08-LRTDA)

Programming Note

The following details of the RTPS FORTRAN IV system may be of interest to some users.

FORTTRAN does not add a line feed after each carriage return when transferring formatted data to a mass storage device. Also, null characters in a Hollerith field are currently treated as \emptyset . More preferable handling would be for the character to be 40. Both of these conditions will be corrected in the next release.

Users should also be aware that, due to the nature of binary numbers, some numbers cannot be represented internally as an exact value. This is most observable after a propagating-type calculation where a result of \emptyset is anticipated and a value such as 9×10^{-25} is returned.